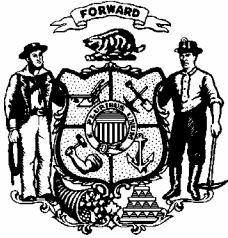


**Sept.
2003**

PUBLIC SERVICE COMMISSION OF WISCONSIN



Final Environmental Impact Statement

Manitowoc Public Utility

Generating Facility

Docket 3320-CE-110

Date Issued, Sept. 2003

PUBLIC SERVICE COMMISSION OF WISCONSIN

Manitowoc Public Utility

Generating Facility

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This final Environmental Impact Statement for the proposed Manitowoc Public Utility Generating Facility project is progress toward compliance with the Public Service Commission's requirement under Wis. Stats. § 1.11 and Wis. Adm. Code § PSC 4.30.

By: _____

Kathleen J. Zuelsdorff
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To the Reader:

This final Environmental Impact Statement (EIS) fulfills part of the requirements of the Wisconsin Environmental Policy Act (WEPA) Wis. Stat. § 1.11. WEPA requires state agencies to consider environmental factors when making major decisions. The purpose of this final EIS is to provide the decision makers, the public, and other stakeholders with an analysis of the social, cultural, and environmental impacts that could result from the construction of a new power plant and its associated facilities. This document has been prepared by the Public Service Commission of Wisconsin (Commission or PSC).

Specific questions on the final EIS should be addressed to:

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The Commission decision on the merit of this project will be based on the record of public hearings that will be held in Manitowoc on October 23, 2003. These hearings satisfy the WEPA requirements of the PSC. The PSC will issue the Notice of Hearing for this project in September 2003. The final EIS, as well as testimony from the public hearings, will be included in the hearing record. A Commission decision on the proposed project is expected in November 2003.

The DNR may hold a separate hearing on the application for an air pollution control permit.

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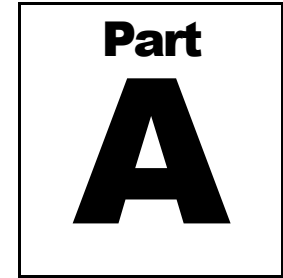
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Executive Summary

Proposal

On November 15, 2002, Manitowoc Public Utilities (MPU), filed an application at the Public Service Commission (Commission or PSC) for a Certificate of Authority (CA) under Wis. Stat. § 196.49(3)(a) and Wis. Admin. Code ch. PSC 112, to construct and operate a generating facility in the city of Manitowoc, Manitowoc County.

MPU is an electric/steam municipal utility that currently owns six generating units with a total generating capacity of 102.5 MW. The new unit would consist of a nominal 63.3 MW atmospheric pressure circulating fluidized bed boiler (CFB), turbine generator set and associated pollution control and material handling equipment.

MPU must obtain several approvals and permits from the Wisconsin Department of Natural Resources (DNR) before construction can begin. These include air pollution control construction and operation permit, Wisconsin Pollution Discharge Elimination System (WPDES) water discharge permit, and permits from other state agencies, United States Environmental Protection Agency (EPA) and the city of Manitowoc.

Location

The project is located on Lake Michigan south of downtown Manitowoc. The proposed unit would be constructed at the east end of an existing building that currently has four steam boilers.

The building is located on Columbus Street, city of Manitowoc in Manitowoc County, Wisconsin. No additional land purchase is required, but the building and storage facilities would be expanded from 84,000 and 110,400 square feet, to 91,200 and 195,000 feet, respectively, on lands currently owned by MPU.

The proposed unit would qualify as a cogeneration plant according to the engineering and efficiency standards in federal law, 18 CFR § 292.205, as referenced in Wis. Admin. Code § PSC 111.53(2)(b).

The process used to select the site is based on MPU's least-cost power supply plan which indicates that the system will be more cost effective if the new unit is built as an expansion to the existing facilities at MPU's existing site.

Ownership

MPU would be the owner and operator of the proposed 63.3 MW CFB. MPU is a municipally owned electric and water utility serving 16,000 customers in the community of Manitowoc.

Project Description

The new unit would be an atmospheric pressurized circulating fluidized bed (CFB) boiler that would operate as a baseload facility. It would be a cogeneration facility that would fire coal, petroleum coke, paper pellets or a combination of the three fuels with natural gas as a backup fuel, and would be capable of providing 63.3 MW of electric power, and up to an additional 25,000 pounds per hour of steam for use by downtown commercial, governmental and industrial facilities.

Need for the Project

The need for an additional power plant is based on the forecasted increase in demand for electricity. It is expected that demand will grow at the rate of 1.8 percent per year through 2020.

To meet the growing demand, MPU considered several options including long-term power supply contracts, independent power producer (IPP) power supply options, and upgrades to the existing system. Based on MPU's least cost power supply plan, building a new plant as proposed is the most cost-effective option.

Environmental Impact

The proposed project site is located in Sections 29 and 32, Township 19 North, Range 24 East in the city of Manitowoc on Columbus Street, Manitowoc County, Wisconsin. The site is currently zoned I-1, a zoning code suitable for construction of new power plant.

Air Quality

MPU has submitted a Prevention of Significant Deterioration (PSD) permit application to the DNR for a new 63.3 MW boiler. Operation of the proposed project would emit several pollutants, but implementation of best available control technology (BACT), equivalent BACT for control of particulate matter, and elimination of Boiler 5 would ensure compliance with National Ambient Air Quality Standards (NAAQS).

Water

Water for all potable and process plant requirements would be supplied from MPU's municipal water system. On average about 110,900 gallons of water per day would be withdrawn from the municipal water system into an adjacent water treatment plant and piped through a dedicated water supply line to the new unit.

In addition, approximately 52.5 million gallons of water from Lake Michigan would be pumped through the new unit's steam condenser on a daily basis for cooling purposes, and returned back to the lake.

With the construction of the new unit, MPU does not anticipate any physical changes to the water intake structure.

Vegetation and Wildlife

The site completely lies within the existing plant property, which has been in existence since 1914. Due to its urban location and highly-disturbed character, no vegetation or animal communities are observed at the site. Consequently, no impact on vegetation or animal communities is expected.

Land Use

Currently, the building, used for a power plant since 1916, has four steam boilers. The new boiler would be placed at the east end of this building.

The land is owned by MPU, and zoned I-1, a designation for a light industrial district that allows placement of power plants.

Local Community Services

The city of Manitowoc currently provides fire protection, emergency medical services, police services, and waste pick-up services for the MPU. Since the site lies completely within an existing plant site, no significant impact to current levels of municipal service is expected.

Fogging and Icing

The proposed plant addition does not utilize cooling towers, so no cooling tower fogging, icing, or visible plumes would be expected.

Noise

The proposed new unit would use the existing stack, and be enclosed in a double-steel walled building. Consequently, no significant increases in sound levels are anticipated.

Description of the Project

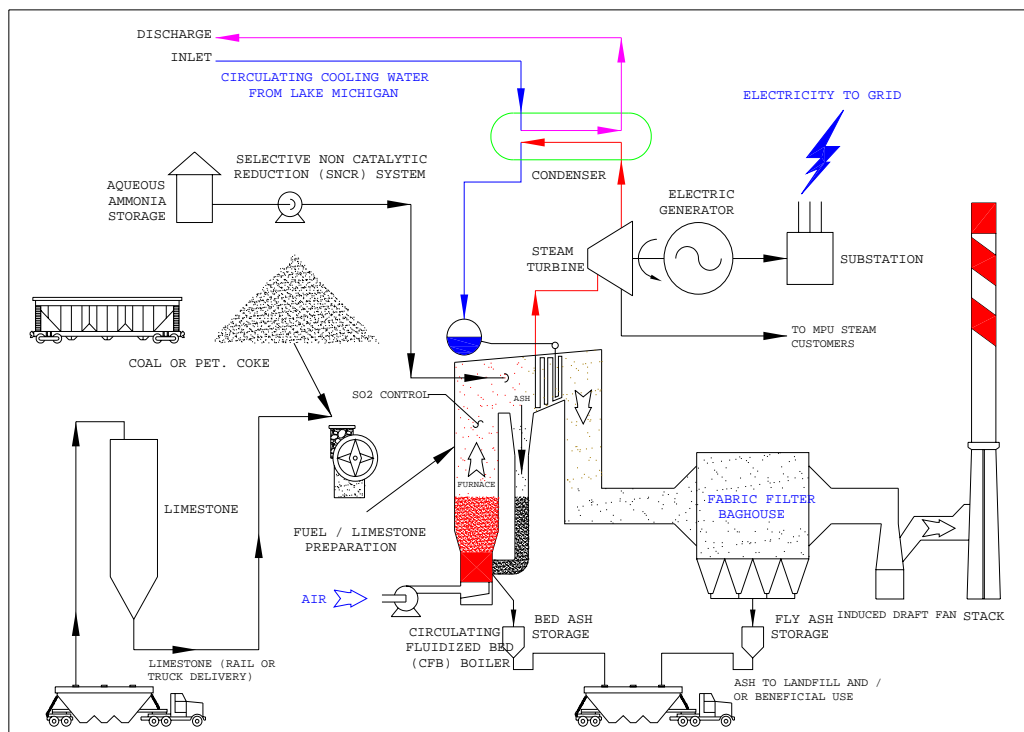
Generating Facilities

Type of Power Plant Proposed

Manitowoc Public Utilities (MPU) is proposing to expand its existing Columbus Street Power Plant (MPU Power Plant) by building a 63.3 megawatt (MW) petroleum coke-fired atmospheric pressure circulating fluidized bed (CFB) boiler. MPU filed an application at the PSC on November 15, 2002, for a Certificate of Authority to construct the CFB boiler. The boiler would produce steam that would be used to turn a steam turbine generator set. The new steam/electric cogeneration unit would be operated as a baseload facility.

A simplified process flow diagram of the proposed steam/electric cogeneration unit is shown in Figure 1-1.

Figure 1-1 Process flow diagram of the proposed steam/electric cogeneration unit



Project Description

Existing plant facilities

The MPU Power Plant is located on Lake Michigan, south of downtown Manitowoc. The proposed CFB unit would be constructed at the east end of the existing power plant, which has been in operation since 1916. The plant currently has four steam boilers. The boilers provide steam to a dual pressure steam header system that supplies five steam turbines.

The type, age and capacity of the boilers and steam turbines are listed below.

- | | |
|---------------------|------------------|
| • Boiler 5 (stoker) | 51 years/15 MW |
| • Boiler 6 (stoker) | 47 years/17.5 MW |
| • Boiler 7 (stoker) | 39 years/17.5 MW |
| • Boiler 8 (CFB) | 13 years/21 MW |
| • Diesels (2) | 18 years/11 MW |
| • Steam Turbine 2 | 68 years |
| • Steam Turbine 3 | 63 years |
| • Steam Turbine 4 | 52 years |
| • Steam Turbine 5 | 47 years |
| • Steam Turbine 6 | 39 years |

MPU states that once the new CFB boiler is operational, it would discontinue the solid-fuel firing capabilities in Boiler 5, which has had environmental compliance problems. Boiler 5 would then operate only on natural gas, using the existing gas fuel burner system, and would only be used as a back-up steam supply boiler. Steam turbines 2 and 3 would then also be retired.

MPU has a district heating system serving both industrial and institutional customers. The MPU Power Plant is a cogeneration facility, with low-pressure steam extracted from the steam turbines, providing up to 200,000 pounds per hour (lbs./hr.) of steam for use by downtown commercial, governmental and industrial facilities. Currently, steam is supplied to the Busch Agricultural Resources, Inc., malt plant; the local high school; and the hot water district heating system. The district heating system provides energy to the county courthouse, county jail, a local church, and several area businesses via a closed hot water loop. The steam is currently supplied at 30 psig.

The proposed CFB (Unit 9) project would include a controlled extraction point on the new steam turbine that would allow MPU to supply additional steam at a higher efficiency to existing and potential customers. The proposed CFB unit could increase the plant's supply of steam to 225,000 lbs./hr.

Proposed technology

Atmospheric pressure circulating fluidized bed is the combustion technology that would be used for the proposed Unit 9 generating unit. Unit 8, a 21 MW facility built in 1990, at the MPU Power Plant uses this same boiler technology.

The CFB boiler would combust petroleum coke (and natural gas during startup) in a limestone matrix. In the furnace section of the CFB boiler a mixture of fuel, limestone, char and ash is suspended or “fluidized” in an upwardly flowing gas stream. Although the fuel particles and limestone are solids, the combination of fuel particles, limestone and combustion air exhibits fluid-like properties. Combustion air forced in at the bottom of the furnace keeps the bed in a constantly upward moving flow. At the top of the furnace, relatively large entrained particles are separated (sink) from smaller ash particles and are returned to the furnace until combustion is complete. That is why this combustion technology is referred to as a circulating fluidized bed boiler.

Combustion takes place within the furnace “bed” at relatively low combustion temperatures ranging from 1,500 to 1,650 degrees Fahrenheit (°F). Typical pulverized coal-fired boilers have flame temperatures of 2,000 to 2,400°F, while cyclone boilers have flame temperatures of more than 3,000°F. Because thermal NO_x formation is a high-temperature process occurring at temperatures in excess of 2,000°F, the lower CFB boiler operating temperature significantly reduces NO_x production. The addition of limestone to the fluidized bed allows the boiler to remove fuel sulfur directly in the boiler.

Both the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) consider CFB boiler technology a “Clean Coal Technology” as the use of limestone as part of the fluidized bed matrix and the relatively low combustion temperatures, respectively, are responsible for reducing sulphur dioxide (SO₂) and nitrogen oxide (NO_x) emissions. Furthermore, the nature of fluidized bed combustion makes it highly fuel flexible. For the existing CFB Unit 8 and the proposed CFB Unit 9, this flexibility allows the boilers to co-fire petroleum coke, coal, and paper pellets.

Size and Dimensions of Plant Unit

The proposed CFB generating unit would produce 63.3 MW when there is no extraction for steam customers. The plant auxiliary load is estimated to be 5 MW, so the net output would be 58.3 MW, with an annual net generation of 454,530 MWh. At 200,000 lbs./hour of export steam, the electrical output would be approximately 51.8 MW. The Unit 9 boiler operating condition at full capacity would be 475,000 pounds per hour of superheated steam at 1,500 psig and 1,005°F.

Figure 1-2 illustrates the preliminary layout for the proposed Unit 9 plant addition at the existing MPU Power Plant.

The dimensions of the main plant components are:

- Boiler Building: 120 ft. x 80 ft. x 155 ft. high
- Turbine Building: 130 ft. x 70 ft. x 70 ft. high
- Baghouse: 60 ft. x 40 ft. x 60 ft. high

Water Sources, Water Usage and Discharge

Water for all potable and process plant requirements for the Columbus Street Power Plant would be supplied from the MPU municipal water system. The water treatment plant is located adjacent to the power

Figure 1-2 Preliminary layout for the proposed power plant



plant. There is a dedicated supply line from the water treatment plant to the power plant with sufficient capacity to supply the net additional water requirements for the proposed Unit 9 CFB boiler.

The uses and discharges of municipal water for the new CFB unit are provided below.

Table 1-1 Water use and discharge

Uses	Gallons per Day	Million Gallons per Year
Demineralized water	79,000	24.6
Potable water	2,900	0.9
Miscellaneous plant use	29,000	8.9
Total use	110,900	34.4
Discharges	Gallons per Day	Million Gallons per Year
Losses to atmosphere	14,000	4.4
Discharge to sewer	65,000	20.2
Potable water	2,900	0.9
Condensate (non-return)	29,000	8.9
Total discharges	110,900	34.4

Water from Lake Michigan would be used for non-contact once-through cooling of the steam turbine condenser. Approximately 52.5 million gallons of lake water would be pumped through the Unit 9 steam condenser on a daily basis and returned back to the lake. Annually, this amounts to over 16,000 million gallons of lake water that would be used for cooling purposes for the proposed unit.

The existing water intake systems operated by the utility for the MPU Power Plant and existing drinking water supply would be used to supply the water needed to operate the plant. MPU would not make any physical changes to the existing water intake structures to accommodate the new unit. The existing power plant discharges circulating cooling water at the shore of Lake Michigan near the end of Columbus Street. The average temperature rise for the water is 20°F.

Plant Ownership and Operation

MPU would be the owner and operator of the proposed 63.3 MW CFB boiler to be built at the existing MPU Columbus Street Generating Station. MPU is a municipally owned electric and water utility serving over 16,000 customers in the community of Manitowoc.

American Transmission Company (ATC) would be the owner and operator of the electric transmission system modifications that would interconnect the power plant to the existing transmission grid. ATC is a public utility engaged in rendering electric transmission service in the state of Wisconsin.

Expected Hours of Operation and Expected Life of Plant

The assumed capacity factor for the CFB Unit is 89 percent. MPU expects the unit to be operated as a baseload facility over a life of 40 years or more. The unit would operate 24 hours per day. The generating facility would shut down occasionally for planned and unplanned maintenance work. Planned outages, totaling three weeks per year, would occur in the spring and fall for routine inspection and maintenance.

MPU estimates yearly unplanned (forced) outages of two- to three-week duration for unplanned maintenance work.

Construction Activities and Schedule

Construction of the proposed power plant addition cannot be started until MPU receives the necessary DNR air emissions and water permits, and until the Commission approves the project. In its construction application, MPU anticipated that local, state, and federal permitting would be completed by October 2003 and that the plant would be in service in January 2006.

Major construction activities would occur on-site or adjacent to the site. The 26-month construction schedule would include the following construction activities:

- Demolish existing vacant building on the east side of the power plant.
- Excavate and prepare temporary site access.
- Construct foundations for boiler building, turbine building and baghouse.
- Erect steel structure.
- Erect boiler and enclose boiler building.
- Install turbine.
- Install baghouse and flue gas system.
- Install fuel handling equipment.
- Complete electrical and mechanical work.
- Remove temporary roads.
- Complete final grading, roads, and landscaping.

Coal Plant Equipment and Auxiliary Facilities

The new generating unit would consist of the CFB boiler, steam turbine generator, and associated solid fuel, limestone and ash handling equipment. Further components of this expansion project would include feedwater pumps, induced draft fan, baghouse, air pollution controls, water treatment system, station air dryers, and circulating water system.

Unit 9 would be integrated into the MPU Power Plant and would share existing infrastructure, including the existing Boiler 5 stack. Some modifications would be needed to the existing fuel transportation and handling facilities to accommodate the increased capacity requirements. The existing fuel storage areas would be used for storage of all fuel required by the new unit.

The cooling water intake systems extending into Lake Michigan would not be modified for this project. The circulating cooling water for Unit 9 would be discharged from a new outfall structure located adjacent to the existing MPU circulating cooling water outfall located at the end of Columbus Street. This outfall would be an on-shore outfall, with an estimated diameter of 36 inches. The existing stormwater collection and treatment systems would continue to be used.

Petroleum coke is primarily delivered to the plant site by rail. During the spring, summer, and fall months, coke is unloaded into the East Track hopper and conveyed by a covered conveyor system to the Boiler 8 silo (40-hour storage capacity). With this project, an additional Boiler 9 silo, with a 24-hour storage capacity, would be built to accommodate the additional petroleum coke. During the winter months, coke would continue to be stored in an on-site storage pile or at the C. Reiss Coal Company fuel storage area which is located approximately a half mile north of the plant. To build-up petroleum coke for the winter season, MPU would increase rail car shipments by over 30 percent during the fall season.

Currently coal is primarily delivered by barge and unloaded at the C. Reiss Coal Company dock, then delivered to the site by truck as needed. The coal enters the fuel handling system at the West Track hopper, is crushed and then loaded to an enclosed conveyor system, which then transports the coal to Boiler 6 and 7 bunkers. An additional new coal bunker is planned for Boiler 9.

Paper pellets for the boilers are delivered to the plant site by truck and stored on a day pile. The pellets are blended with the petroleum coke/coal fuels in a blending hopper immediately after the crushing operation at the base of the enclosed conveyor system.

Processed limestone is received at the plant by truck and rail car. It is unloaded pneumatically directly into the limestone storage silo used in Boiler 8. Since the limestone is received in a processed, dried, and crushed form there is no need for outdoor storage or for drying or processing equipment. The new boiler would use approximately 70,000 tons per year of limestone when firing petroleum coke, and would require a new limestone silo that would be located adjacent to the new coal bunker.

Unit 9 would also have handling systems to remove fly ash and bed ash from the site. Fly ash would be collected at the baghouse, then conveyed via a covered conveyor system to a storage silo (three-day capacity), for subsequent removal offsite by truck or rail. Bed ash would be transferred from the stripper coolers and associated rotary vane feeders to an ash silo (three-day capacity) via a pneumatic piping system. Bed ash would then be loaded through a telescoping chute into trucks or rail cars for removal from site.

At this time, MPU is currently evaluating the Best Available Control Technology (BACT) for NO_x control. It appears that the Unit 9 boiler would utilize a Selective Non-Catalytic Reactor (SNCR). This form of NO_x control would inject aqueous ammonia (ammonia dissolved in water) into the flue gas. The solution concentration, by industry standards, and the ammonia storage tank capacity has not been determined yet. If MPU opts for a 19.3 percent ammonia solution concentration, an 18,000 gallon capacity tank would be needed. Should the concentration be higher, at 29.4 percent, a 9,000 gallon tank would be installed.

MPU would also make some changes to the rail system in the area of the power plant, though these changes are not directly related to the Unit 9 plant expansion project. The Canadian National Railroad (CN) line is adjacent to the east side of the power plant and normally two trains per day move through the yard on the way to Busch Agricultural Resources, Inc. and the sidings to the north of the plant. MPU has had problems in relying on CN to perform the switching to bring cars from the sidings north of the plant. The utility has plans of installing a 1,380-foot bypass spur track that would allow MPU employees to move rail cars directly from the siding north of the plant to an unloading area on the MPU property. This would allow switching to take place at MPU's convenience, instead of only when the rail engines are available.

Electric Transmission and Natural Gas Interconnections

An electric transmission line tap would be constructed to provide the necessary electrical interconnection from the power plant to the existing transmission system. MPU proposes to connect the new CFB unit to the 69 kV distribution system at its existing Lakefront Substation, which is located on-site. The new unit would nominally generate power at 13.8 kV and a 13.8/69 kV generator step-up transformer would be installed to allow interconnection to the ATC system within the substation. The electrical interconnection would also include system protection relaying to provide protection for the new generator and transformer, and for ATC's 69 kV equipment.

All of the electric transmission interconnection equipment necessary to tie MPU's system in to the electric grid would be located on-site, within existing substations or within the existing right-of-way. The project would not require any new electric transmission lines to be constructed. Consequently, no adverse environmental impact is expected.

Natural gas is already supplied to the power plant in sufficient quantities for the proposed CFB Boiler 9 operations. The only changes that would be needed to the current natural gas system would be to reroute the gas pipeline inside the boiler house to connect the new CFB Boiler 9, and current plant loads, to the existing pipeline.

The project would not require any new natural gas pipelines.

Fuels

The primary fuel for the proposed Unit 9 CFB boiler would be petroleum coke. MPU's fuel plan is to maximize the use of petroleum coke, and supplement with coal and paper pellets. Natural gas would be used as a start-up fuel.

Petroleum coke is a carbon byproduct from the process of refining heavy oil into gasoline. It has a high heating value and a high sulfur content, but has very low ash and mercury contents. In appearance, petroleum coke looks much like coal.

MPU has been using petroleum coke in its Unit 8 CFB boiler at its MPU Power Plant for over 12 years. Boiler 8 is an early generation CFB boiler and cannot fire 100 percent petroleum coke due to cyclone pluggage. Typically, the utility has burned an 80 percent/20 percent ratio of coke/coal, and, subject to availability, up to 10 percent paper pellets to round out the fuel mix.

The petroleum coke comes from the Koch Carbon Refinery in St. Paul, Minnesota. The coal is Pittsburgh #8 coal from the Consol Coal Company Bailey/Enlow Fork Mines. The paper pellets, when available, come from Pellet America Company in Appleton, Wisconsin. The same fuels currently used for Unit 8 would be used for Unit 9.

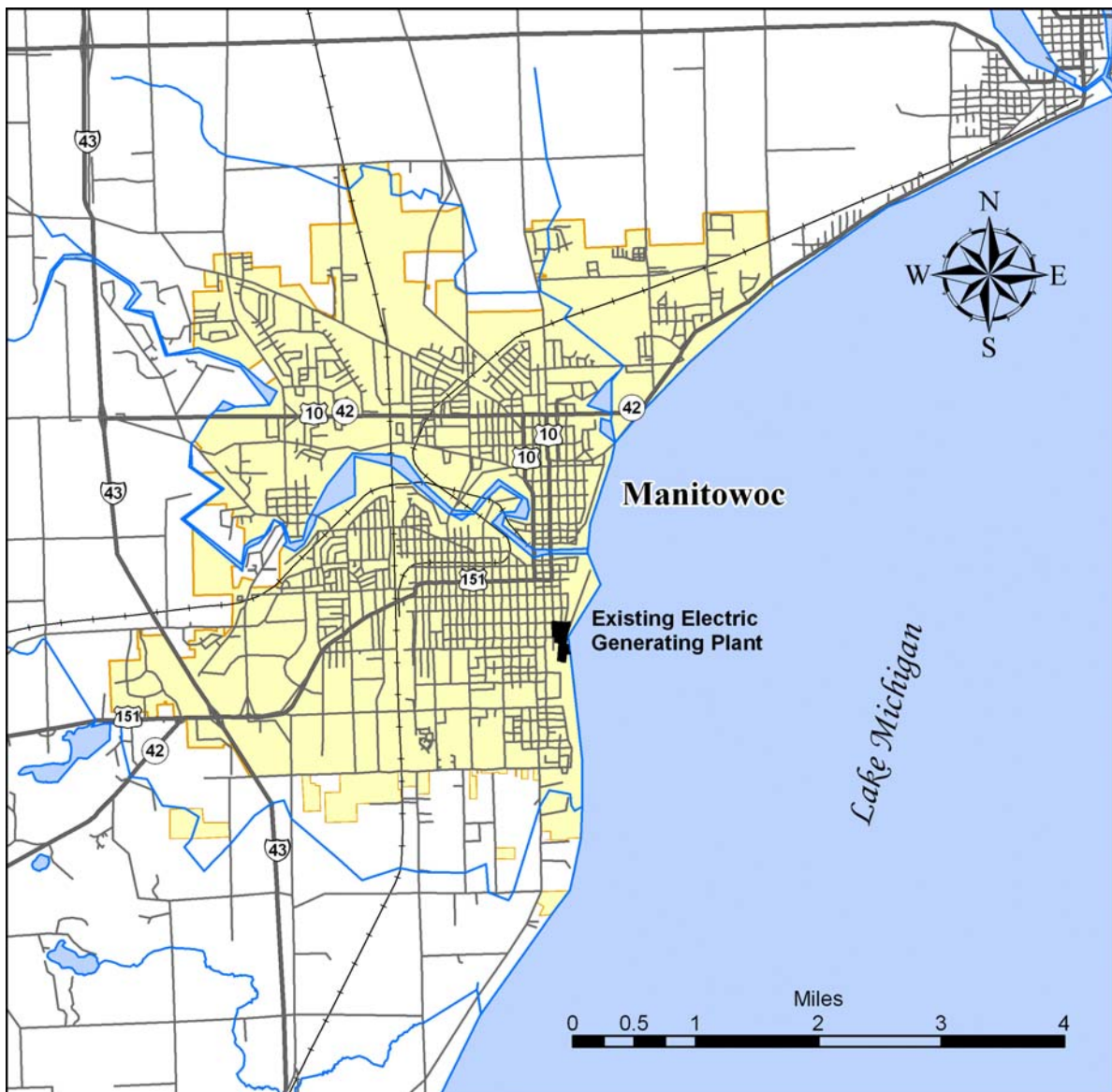
Annual petroleum coke usage for the new boiler would be 176,000 tons per year, based on an 89 percent capacity factor. In the event the utility would have to burn a mixture of petroleum coke and coal, it would most likely use an 80 percent/20 percent blend which would result in 140,800 tons per year of coke and 38,200 tons per year of coal.

Site Description, History and Selection Process

The proposed new unit will be placed at the east end of an existing MPU building that currently has four steam boilers. Although no additional land purchase is required, the building and storage facilities would be expanded from 84,000 and 110,400 square feet to 91,200 and 195,000 square feet respectively on land currently owned by MPU in order to accommodate the new unit.

The building is located on Columbus Street, city of Manitowoc in Manitowoc County, Wisconsin. A map showing the location of the site relative to major geographic features such as highways, the city of Manitowoc boundaries, Manitowoc River, and Lake Michigan is presented as Figure 1-3.

Figure 1-3 Project location map



The existing building is in the southwest quarter of Section 29 and northwest quarter of Section 32, Township 19 North, Range 24 East, city of Manitowoc, Manitowoc County.

The building, owned by MPU since early 1900, has been used for power plants since 1916. At that time, it had a steam turbine-generator with a capacity of 810 kilowatts that served approximately 2,000 customers.

To meet the growing demand, MPU continuously added more capacity at its site, and by the beginning of World War II, it had a capacity of more than 20,000 kilowatts. By the mid-1940s, the utility commission approved a plan to supply steam for Rahr Malting Company (now Busch Agricultural Resources, Inc.). Steam and hot water sales to nearby customers also expanded considerably during this time period.

In the 1950s two new turbines were added to the system, increasing MPU's capacity to 52 MW. In the meantime, power outages during this period heightened interest in interconnection possibilities with the state's electric grid. Consequently, by the spring of 1961 some substations and transmissions lines were completed, and interconnection was established with Wisconsin Public Service Corporation (WPSC), an investor-owned utility operating out of Green Bay. That same year MPU sought additional capacity and the PSC approved MPU's plan to purchase a new 22 MW generator. As a result by 1964, MPU supplied electricity to 11,572 customers.

In 1991, MPU added a 20 MW fluidized bed boiler, a 24.5 MW combustion turbine (CT) and associated transmission lines to meet the electrical needs of the southwest portion of the city and any future expansion of the industrial parks west of I-43. Currently, MPU has a total capacity of about 110 MW.

The process used to select the site for the new boiler is based on MPU's least-cost power supply plan. The plan indicates that the system would be more-cost effective if the boiler is built as an expansion to the existing facilities at MPU's existing site. At this site, the boiler would use the existing fuel delivery and handling, water supply and treatment, water cooling, solid waste handling and storage, cogeneration steam supply, and transmission interconnection. In addition, no additional staff would be necessary to operate and maintain the new CFB boiler.

The site also provides environmental benefits by eliminating the solid fuel firing capabilities of Boiler 5. This would result in SO₂ and PM/PM₁₀ emission reductions.

Description of the Regulatory Process

General Commission Construction Case Process

Application for Commission certification

Public utilities proposing to build a power plant less than 100 MW in Wisconsin must obtain approval from the Commission in the form of a Certificate of Authority (CA) before construction can begin. The Commission makes the final decision about whether a power plant is built and where it is sited. The Commission consists of three members, who are appointed by the Governor and approved by the Senate.

DNR permitting authority

The developer of a proposed power plant must obtain several permits from the DNR. The primary DNR approval needed before power plant construction may begin is the construction permit for a new source emitting significant quantities of air pollutants. DNR storm water management permits are necessary during construction and operation of the power plant. A WPDES discharge permit must be issued prior to the power plant initiating the discharge of process wastewaters, including once-through condenser cooling water, to surface waters. Construction plans must be approved by the DNR before process wastewater outfalls are constructed. Other DNR permits may be required for various parts of a power plant project, depending on circumstances and the expected impacts.

Wisconsin Environmental Policy Act

Environmental impact statement

The Wisconsin Environmental Policy Act (WEPA), Wis. Stat § 1.11, requires all state agencies to consider the environmental impacts of major actions that could significantly affect the quality of human environment. A proposal for a petroleum coke-fired CFB boiler constructed at the site of an existing electric generating facility requires an environmental impact statement (EIS) under Wis. Admin. Code § PSC 4.10. The Commission prepares the EIS. The EIS describes the project, discusses possible alternatives to the proposed action, and evaluates the project impacts on the natural and human environment.

The EIS process has several stages: a draft EIS is produced and circulated for comment; the comments are considered in preparing a final EIS; and a hearing is held in the project area.

Public participation in the EIS process

As part of its scoping responsibilities under Wis. Admin. Code § 4.30(2), the Commission solicits comments from any person it believes is interested in the proposed action. The Commission distributes copies of the project application to local clerks and libraries, for inspection by the public.

The applicant, Commission, or both entities may hold public information meetings in the project area early in the process. At these meetings, the public can learn more about the project, the applicant can improve its application, and Commission staff can learn more about local concerns and interests before beginning to prepare the draft EIS.

On July 22, 2003, the Commission issued a draft EIS. The issuance of the draft EIS was followed by a 45-day comment period. After the final EIS is issued, there is a 30-day period to allow individuals to read the final EIS and prepare for the hearing. The Commission provides notice to the public and holds a hearing in the project area. The hearing is the opportunity for the public to make their views known to the Commissioners.

Processes and Public Participation for This Case

Application filed – PSC docket 3320-CE-110

On November 15, 2002, MPU filed a Certificate of Authority application to construct a 55 MW steam/electric co-generation at the existing MPU Power Plant. The application was revised on April 11, 2003. The capacity of the new unit was increased to 64 MW. The project was assigned PSC docket number 3320-CE-110. Applications for several permits were also filed with other state agencies, local government and the federal government. Docket 3320-CE-110 is a Class 1 contested case, subject to the procedures prescribed in Wis. Stat. ch. 227 and Wis. Admin. Code ch. PSC 2. The Commission issued its Notice of Proceeding on January 24, 2003.

On January 3, 2003, the Commission issued a public notification to interested and affected persons, public officials, and other places accessible to the general public. The notification explained the Commission's review process and solicited comments and questions about the proposed project.

On January 12, 2003, the Commission distributed copies of the application to local clerks and county libraries in the project area.

The Commission issued the draft EIS on July 22, 2003. The public comment period of 45 days ended on September 5, 2003. Comments were received and incorporated into this final EIS.

About 30 days after the final EIS is issued, the Commission will hold a hearing in the project area on the final EIS and the CA application. A Notice of Hearing will be issued at least 30 days before the scheduled hearing date, possibly with the final EIS. After the hearing is complete and transcripts of the hearing are received, the three Commissioners will make a decision to approve, modify, or reject the proposed project based on information presented at the hearing. Any conditions it determines necessary will be included in the construction order.

Federal authority

Two federal permits or approvals are also required. The U.S. EPA has delegated responsibility to the DNR to issue major source prevention of significant deterioration (PSD) and other air pollution permits. DNR wastewater discharge and acid rain permits are also issued under delegated federal authority.

Permits Required

Permits and approvals for the siting, construction, and operation of the MPU project are required at the local, state, and federal levels. Tables 1-2, 1-3, and 1-4 are a summary of the permits and approvals required for the construction and operation of the project from local, state and federal government agencies, respectively.

Table 1-2 Summary of local government permits and approvals required by MPU

Permitting Agency	Type of Action	Regulatory Authority	Contact
City of Manitowoc Planning Department	Site Plan Approval	15.37(2)(a) of the Manitowoc Municipal Code	Planning Department (920)686-6930

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Table 1-3 Summary of the state government permits and approvals required by MPU

Permitting Agency	Type of Action	Regulatory Authority	Contact
DNR – Bureau of Air Management	Air Pollution Control Construction and Operation Permit	NR 406, NR 407, and NR 408, Wis. Admin. Code	Jeffery Hanson (608)266-6876
DNR – Bureau of Watershed Management	Construction Site Storm Water Discharge Permit	NR 216.28(4), Wis. Admin. Code	Cheryl Bougie (920)448-5141
DNR – Bureau of Watershed Management	WPDES Industrial Storm Water Discharge Permit	NR 216.28(4), Wis. Admin. Code	Cheryl Bougie (920)448-5141
DNR – Bureau of Watershed Management	WPDES Process Wastewater Discharge Permit	ch. 283, Stats.	Mike Hammers (608)267-7640
DNR – Bureau of Watershed Management	Approval of outfall and discharge monitoring equipment plans	s. 283.41, Stats.	Mike Hammers (608)267-7640
DNR – Bureau of Endangered Resources	Wisconsin Natural Heritage Inventory	NR 29, Wis. Admin. Code	NA
Wisconsin Historical Society	Site survey for known historical/archeological sites	National Historic Preservation Act 106 and Wisconsin Historic Preservation Act compliance	NA
Wisconsin Dept. of Commerce (DOC) – Bureau of Storage Tank Regulation	Approval of plans; registration of AST	Comm. 10, Wis. Admin. Code	NA
DOC – Safety and Building Inspections	Plan review, approval and inspection	Comm. 61-65, Wis. Admin. Code	Bill Sullivan (608)266-9643
DOC – Plumbing and Sanitary Permits	Plan review, approval and inspection	Comm. 80-85, Wis. Admin. Code	NA
DOC – Boiler and Pressure Vessels	Approval and permitting	Comm. 41, Wis. Admin. Code	James Markiewicz (920)428-9423
Dept. of Transportation	Approval for single trip or multiple trip permit	Trans. 254 or Trans. 255, Wis. Admin. Code	NA
Dept. of Agriculture, Trade and Consumer Protection	Ag. impacts resulting from use of power of eminent domain	s. 5.32,035 and s. 32,035, Wis. Stat.	NA
PSC	Certificate of Authority	PSC 111 and s. 196.491, Wis. Stat.	Scot Cullen (608)267-9229

Table 1-4 Summary of the federal government permits and approvals required by MPU

Permitting Agency	Type of Approval	Regulatory Authority	Contact
U.S. Environmental Protection Agency	New source performance standards	40 CFR part 60, Subpart Da	NA
U.S. Environmental Protection Agency	Acid Rain Permit	40 CFR 72.30	Constantine Blathras (312)886-0671
U.S. Federal Aviation Administration	“No Hazard” determination re: stack height	14 CFR 77.13	NA
U.S. Dept. of the Interior	Applicability of preservation requirements	National Historic Preservation Act, s. 106	NA
U.S. Fish and Wildlife Service	Threatened and endangered species review		NA

Chapter 2

Project Need and Cost

Electrical Need

Projected Growth in Demand

Table 2-1 provides data on peak demand and energy sales as forecasted by MPU through 2020 in their application for a new electric power generation station. The table also provides the growth rate for demand and energy.

Table 2-1 MPU system demand, energy forecast, and growth rate

	Peak Demand (MW)	Energy Sales (MWh)
2003	116	512,035
2004(*)	108	509,321
2005	110	516,299
2007	114	535,053
2012	125	584,973
2017	136	639,550
2020	144	674,711
Growth (%/year)		
2004-2007	1.8	1.7
2004-2012	1.8	1.7
2012-2017	1.7	1.8
2004-2020	1.8	1.8

*The expected decrease in peak demand and energy in 2004 is due to the closing of Mirro Plant in October 2003. Mirro currently receives its electricity from MPU.

Table 2-2 provides historical 1998-2002 MPU data as provided by MPU.

Table 2-2 Historical 1998-2002 MPU electric data and growth rates

	Gross Demand MW	Total Energy MWh	Energy Sales MWh
1998	107	554,349	527,362
1999	114	557,935	541,838

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	Gross Demand MW	Total Energy MWh	Energy Sales MWh
2000	110	580,659	555,224
2001	117	556,958	537,938
2002	114	560,049	540,514
Growth (%/year)			
1998-2002	1.6	.3	.6
2000-2002	1.8	-1.8	-1.3

As Table 2-1 shows, MPU's projected rate of growth for demand for the years 2004 to 2012, and 2004 to 2020, is estimated at 1.8 percent per year. This projected rate of growth is approximately similar to the historical rate of growth for gross demand for the years 1998 to 2002, shown in Table 2-2. Thus, MPU's projected rate of growth in demand is similar to its historical rate of growth.

Further, Commission staff compared MPU's forecast with another forecast developed in conjunction with docket 05-CE-130, the Elm Road coal generating plant proposed by Wisconsin Energy. As shown in Table 2-3, the MPU projected growth rate of 1.8 percent/year for 2004-2020 is the same as the PSC alternative projected peak growth for 2004-2020. Thus, the MPU projection used in MPU's filing for docket 3320-CE-110 is reasonable to use in capacity planning analysis. Commission staff believes MPU's forecast for peak demand and annual energy use is reasonable.

Table 2-3 MPU projected peak demand (MW) and annual energy (MWh) forecasts (MPU forecast vs. PSC alternative forecasts)

	MPU Forecast		PSC Alternative	
	Peak	Energy	Peak	Energy
2003	116	512,035		
2004	108	509,321	108	509,321
2005	110	516,299	110.6	521,545
2007	114	535,053	116.0	546,879
2012	125	584,973	126.8	597,902
2017	136	639,550	137.3	647,290
2020	144	674,711	142.7	672,864
Growth (%/Year)				
2004-2007	1.8	1.7	2.4	2.4
2007-2012	1.9	1.8	1.8	1.8
2004-2012	1.8	1.7	2.0	2.0
2004-2020	1.8	1.8	1.8	1.8

PSC staff used the MPU projected peak demand values and MPU capacity data, including projected retirements and the proposed 2006 plant addition, to calculate the necessary capacity purchases to achieve a 15 percent reserve margin, as used by MPU in planning. Table 2-4 provides the results of this analysis.

Table 2-4 MPU capacity analysis

	(1) Peak Demand (MW)	(2) + 15% Reserve	(3) Existing Capacity (MW) ¹	(2)-(3) Difference ² (MW)	(4) Revised Capacity (MW) ³	Difference ⁴ (MW)
2003	116	133.4	102.5	30.9	102.5	30.9
2004	108	124.2	102.5	21.7	102.5	21.7
2005	110	126.5	102.5	24.0	102.5	24.0
2006	112	128.8	102.5	26.3	136.0	-7.2
2007	114	131.1	102.5	28.6	136.0	-4.9
2008	116	133.4	102.5	30.9	136.0	-2.6
2012	125	143.8	102.5	41.3	136.0	7.8
2017	136	156.4	102.5	53.9	136.0	20.4
2020	144	165.6	102.5	63.1	136.0	29.6

Table 2-4 illustrates that with the net capacity addition in 2006, and the planned retirements, the reserve margin (percent of capacity above peak demand) would be 21.4 percent in 2006, assuming no other capacity purchases. The reserve margin drops below 15 percent after 2008, assuming no other capacity purchases.

Cost

Impact on Rates

The estimated cost of the proposed power plant is \$70,910,000. The construction of the proposed power plant would increase the 2006 revenue requirements of the electric utility by approximately \$730,000, assuming it is placed in service, as proposed, in 2006. This would equate to a 2.3 percent increase in electric and steam rates in 2006. A residential electric customer currently paying a \$40 monthly bill would see an increase of about \$0.92 per month. The increased costs for return on investment, depreciation, maintenance, and fuel would be largely offset by a significant decrease to purchased power expense and revenues from the sale of surplus capacity and energy from the proposed plant. The rate impact of the proposed plant would tend to decline in subsequent years, as the depreciated book value of the plant declines, and the required return on plant investment declines. It was also assumed that the proposed plant would be available for production only 80 percent of the time in its first year in service, due to possible problems in the first year of operations. If the proposed plant is assumed to be available 85 percent of the time in subsequent years, revenues from the sale of surplus capacity and energy would be higher.

¹ Existing capacity: Boiler 5, 15 MW; Boiler 6, 17.5 MW; Boiler 7, 17.5 MW; Boiler 8, 21 MW; Diesel, 11 MW; Custer Street, 20.5 MW.

² Amount of capacity purchases needed to achieve a 15 percent reserve margin, using existing capacity data from Column (3).

³ Revised capacity: Existing, 102.5 MW; Boiler 2 and 3 retirements, 15 MW; Net 2006 capacity addition, 48.5 MW; Net result of constructing the CFB Boiler (63.5 MW), taking into account losses and reduction of capacity associated with Boiler 5 (15 MW).

⁴ Amount of capacity purchases needed to achieve a 15 percent reserve margin, using existing capacity and the planned net capacity addition, and the planned Boiler 2 and 3 retirements in 2006. A negative number in this column implies that no capacity purchases are necessary to achieve the 15 percent reserve margin and that the reserve margin is above 15 percent in these years.

Impact on Taxes

Under current state law, the MPU addition would be exempt from local property taxes. Instead, MPU would pay a tax equivalent payment to the city of Manitowoc each year based on the original cost of the assets in service or under construction at the end of the prior year. MPU's current tax equivalent rate is approximately 1.57 percent. If this rate is applied to the estimated capital cost of the proposed plant of \$70,910,000, MPU would pay approximately \$1,100,000 in annual tax equivalent payments to the city of Manitowoc.

Impact on Local Government

Since there would be no major infrastructure improvements necessary from the city of Manitowoc for the proposed project, there would be no significant increase to the city of Manitowoc's costs due to the construction of MPU's proposed power plant addition.

Impact on Employment

The proposed MPU Power Plant addition would have a direct impact on the local economy, due to the employment of additional workers and their purchases of goods and services during the construction phase of the proposed project. Construction of the proposed power plant would take 30 to 36 months to complete. During this time, the typical number of workers employed would be about 30, with as many as 100 employees during peak construction activity. The work force would include a number of skilled workers, including civil, structural, mechanical, and electrical engineers; electricians; pipe and steamfitters; instrument and control technicians; carpenters; and general construction workers.

There would be no change to the level of MPU Power Plant operators and maintenance workers, if the proposed power plant is built. Existing MPU staff would operate and maintain the new plant.

Project Alternatives

Commission Priorities

Wis. Stat. § 196.025 states "To the extent cost-effective, technically feasible and environmentally sound, the Commission shall implement the priorities under s. 1.12(4) in making all energy-related decisions." Wis. Stat. § 1.12(4) creates the following priorities:

(4) PRIORITIES. In meeting energy demands, the policy of the state is that, to the extent cost-effective and technically feasible, options be considered based on the following priorities, in the order listed:

- (a) Energy conservation and efficiency.
- (b) Noncombustible renewable resources.
- (c) Combustible renewable energy resources.
- (d) Nonrenewable combustible energy resources in the order listed:

1. Natural gas.
2. Oil or coal with a sulphur content of less than 1 percent.
3. All other carbon-based fuels.

The following sections in this chapter address these priorities, roughly in order of their appearance in the above statute.

Energy Efficiency

Energy efficiency includes conservation, load management, and fuel switching. Energy conservation reduces the use of electricity. Load management shifts energy use away from periods when demands are highest. Fuel switching replaces the use of electricity with the use of another fuel, such as natural gas.

Results of energy efficiency

The applicant states that the proposed generating facility is needed because the demand for electricity, including a 15 percent reserve margin, will exceed available supply by 22 MW in 2006 and 39 MW in 2013. Power outages would occur when demand for electricity exceeds supply. To correct such a situation, one can increase the supply or decrease the demand.

The generating facility proposed consists of one baseload CFB coal unit. Fuel switching and general energy conservation contribute to addressing base loads, while load management is generally used to help meet peak loads.

Using energy efficiency to meet system electric needs can have both economic and environmental advantages over using supply resources such as power plants.

Economic advantage

The most significant economic advantage is that, if cost-effective, energy efficiency can reduce customers' electric bills. This is because if the demand for electricity is reduced, less fuel needs to be bought and transported, and fewer power plants or power lines need to be built. This reduction in electric bills helps make Wisconsin businesses more competitive. By reducing the amount of money spent on energy in Wisconsin, energy efficiency can also improve the state's economy in general. This is because most of every energy dollar spent on coal, natural gas, and uranium, the fuels used by power plants to generate electricity, leaves Wisconsin and our economy.

Environmental impacts

From an environmental perspective, energy efficiency is the best option for meeting energy needs. Conservation and some forms of fuel switching reduce air pollution, water use, coals and uranium mining, disposal of radioactive waste, production of greenhouse gases, and the depletion of non-renewable resources. All three forms of energy efficiency reduce the need for power plants and transmission lines, thereby reducing the negative impacts of these facilities. These impacts can include the use of valuable land, destruction of natural habitats, and aesthetic impacts.

There are some potential negative impacts associated with energy efficiency measures. An example of a negative impact from conservation is the need to dispose of spent fluorescent light bulbs. Switching fuels will still have impacts associated with the use of the alternate fuel. Load management, if not properly designed, can lead to discomfort or the inefficient disruption of industrial production. However, the negative effects of energy efficiency measures are negligible compared to the building and operation of power plants and power lines.

The Commission's legal requirements regarding energy efficiency as an alternative

Under Wis. Stat. § 196.491(3)(d)3, in order to approve the generating facility proposed by the applicant, the Commission must find that the coal unit is “in the public interest considering alternative sources of supply...economic (factors)...and environmental factors.” Energy efficiency, if it is available, can be considered an alternative source of supply that can lower costs and would likely result in fewer environmental impacts.

If the Commission finds, under these laws, that there is cost-effective energy efficiency, the Commission's decision must ensure the energy efficiency savings is captured. For the Commission to choose energy efficiency over the proposed generating station, the Commission must find:

- That enough energy efficiency exists to substitute for all or part of the energy demand that would be served by the proposed generating facility (if only part, then something else must provide the rest).
- That energy efficiency would be cost-effective compared to the alternative facilities it would be substituting.
- That the energy efficiency option is environmentally sound.

Changes in the regulation of energy efficiency

Traditionally, the Commission has relied upon electric and natural gas utilities to promote energy efficiency. Utility energy efficiency programs have largely been cost-effective and successful. It is estimated that from 1991 through 2001, Wisconsin utility programs reduced annual electric usage by about 4,300,000 MWh. Based on typical load factors of energy efficiency measures, these energy savings resulted in about 500 MW of peak demand reduction.

However, the regulatory approach to the promotion of energy efficiency has changed. New legislation passed in the fall of 1999 is having a significant impact on how energy efficiency services are delivered. Beginning in 2001, public utilities have less responsibility for delivering energy efficiency services. A substantial amount of utility ratepayers dollars that in the past funded utility-sponsored energy efficiency programs and services are now being transferred to the Department of Administration (DOA). In addition to this existing funding, new fees for energy efficiency are being collected from utilities. The DOA is responsible for the promotion of energy efficiency through administrators that were awarded contracts through competitive bids.

Municipal utilities are required to charge its customers a public benefits fee that collects an annual average of \$16 per meter to fund public benefits programs. Half of the dollars collected through the public benefits fee, about \$140,000, must be used to provide energy efficiency services. The other half is to be used for low-income assistance programs. While public utilities are required to transfer dollars to the DOA for energy

efficiency public benefits programs, municipal utilities have the option of contributing their energy efficiency public benefits dollars to the DOA or providing energy efficiency services through “Commitment to Community” programs. MPU has chosen to provide energy efficiency services through Commitment to Community programs.

Applicant's provision of energy efficiency services

MPU has provided energy efficiency services since the late 1980s. Through its Commitment to Community programs, MPU is currently providing energy efficiency services to residential, commercial, and industrial customers. Energy education, in the form of newsletters, performances at schools, newspaper advertisements, and press releases, is available to all customers. In addition to these education services, residential customers can receive a reward for the removal of working inefficient appliances or rebates for the purchase of Energy Star® appliances and lighting products. Additional services available to commercial and industrial customers are technical support, such as utility bill analysis and payback calculations, energy audits, and rebates for qualifying equipment. MPU estimates that its energy efficiency programs have reduced peak demand by 4.6 MW and 23 GWh from 1989 through 2002. In addition to these savings, MPU has 5.2 MW of interruptible service under contract with its industrial customers.

Staff's analysis of energy efficiency potential

Commission staff conducted an energy efficiency analysis of MPU services. Staff's analysis compares the energy efficiency potential identified in the Commission-approved Statewide Technical and Economic Potential (STEP) Study, adjusted for market potential, to the level of energy efficiency estimated to be included in the forecast supporting the proposed generating facility. Because the proposed generating facility is a baseload plant, staff looked at the potential for both additional energy and demand savings. Staff's analysis estimates energy efficiency potential in the year 2006, the proposed in-service date of CFB unit.

STEP Study

The STEP study was a collaborative effort of the state utilities, intervenors, and PSC staff that calculated the economic potential of energy efficiency over 20 years. Economic potential was defined as the electrical load reduction that results when the most efficient measures are adopted by the entire eligible population.

The STEP Study provides an estimate of technical and economic potential, for both energy and demand. This was done for the 20-year period of 1994 through 2014. Conservation, load management, and fuel switching measures were all considered in developing the technical and economic potential estimates. The STEP study was completed in 1994 and updated in 1995. The updated STEP study identified a 20-year economic potential showing 35 percent savings for energy and 29 percent for savings demand. STEP assumes that this potential will be achieved evenly over the 20-year period.

Market potential identified

The STEP study reported demand and energy savings by the end of 20 years. Because it is not always cost-effective to replace existing equipment before the end of its useful life, replacement with more efficient technology was assumed to occur in a straight line during the 20 years. However, some technologies in the STEP report have useful lives less than 20 years. Given the uncertainty of the estimate of economic

potential in 2006, staff developed a scenario that assumed the full economic potential could be achieved in 15 years.

The STEP study also did not estimate market potential. Market potential is that portion of economic potential that is achievable knowing that some eligible customers will not install energy efficiency measures even when it is cost-effective to do so. In order to compare results of the STEP study to the level of energy efficiency included in the applicant's forecast, an adjustment for market potential must be made. There have been limited studies of market potential and the studies have been inconclusive. Given the uncertainty of market potential adjustments, staff's analysis includes two scenarios, assuming market potential levels of 50 and 85 percent.

Staff's most conservative scenario, assuming economic potential being achieved in 20 years and a market potential of 50 percent, identified 6 MW of cost-effective demand savings available by 2006 which are not included in the applicant's forecast. Staff's most aggressive scenario which assumes the economic potential is achieved in 20 years and a market potential of 85 percent, identified an additional 13 MW of cost-effective savings by 2006.

Staff analysis of energy potential identified an additional 27 GWh in 2006 under its most conservative scenario. Staff's most aggressive scenario identified an additional potential of 60 GWh in 2006.

Shortcomings of staff's analysis

Staff's analysis has several shortcomings. These shortcomings likely underestimate the energy efficiency potential. First, staff used Advance Plan 7 (AP-7) estimates of naturally occurring impacts in its estimate of the amount of energy efficiency already included in the applicant's forecast. Naturally occurring impacts are those energy efficiency savings that occur without utility intervention in the energy efficiency market. The forecasting method used by the applicant in support of the proposed generation facility does not allow for the identification of naturally occurring impacts. Because the energy efficiency market has changed since AP-7, these estimates may no longer be accurate. However, AP-7 provides the best estimate of naturally occurring impacts available.

Second, the STEP Study was completed in 1994 and last updated in 1995. The energy efficiency market has changed considerably since the STEP Study was completed. Additional technologies are available, the cost of many technologies has decreased, and laws governing appliances and building shell efficiency have improved the market. While it would have been better to rely on an updated study, one is not available.

In addition to being outdated, the STEP Study did not adequately address industrial energy efficiency potential. This significant weakness was stated in the study:

"This analysis does not include some savings potential available in the industrial sector. This limitation is due to the complexity of estimating the potential for specific industrial processes and to the limited information in W-DOD regarding technology saturations. This information is likely to underestimate savings." (Page E-3, Recalculation of Statewide Technical and Economic Potential)

Summary

MPU has been achieving about 300 kW of savings per year from its energy efficiency services. This amount, 1.2 MW between now and 2006, is already reflected in MPU's forecast. Almost 20 times this amount would be needed to meet MPU's estimated shortfall of 22 MW in 2006. Even if staff's analysis underestimates the cost-effective energy efficiency potential available, there is not likely to be sufficient additional savings to substitute for the total capacity of the applicant's proposed facility.

Renewable Resources

In Wisconsin the noncombustible renewable resources for electric generation are wind, solar, and hydro. Combustible renewable resources include fuel cells, fueled by hydrogen, and biomass energy, derived from wood or plant residue, biological waste, crops grown for use as a resource, or landfill gas. The main renewable energy resources for Wisconsin electric generation appear to be wind power and biomass fuels, including waste-to-energy. At this time, solar power appears too costly to install on a utility scale and there is very little additional hydroelectric power potential available in Wisconsin.

Advantages of renewable resources include:

- Low or no fuel cost (except for some biomass).
- Short lead-times for planning and construction.
- Relatively small, modular plant sizes.
- Reduced environmental effects compared to fossil fuels.
- Non-depletable resource base.
- Potentially more job intensive.
- Favorable public opinion.
- Distributed generation potential.

Disadvantages include:

- Uneven geographic distribution.
- Intermittent nature of some resources.
- Lack of maturity or commercial availability of some technologies.
- Public concern for land use, biodiversity, birds, and aesthetics.
- Environmental issues with some types of biomass fuel supply.
- Relatively high capital cost for some technologies.

Analysis of renewable resources as an alternative

MPU discusses three renewable resources - wind, solar, and biomass - in its application for Certificate of Authority. MPU considered ten 1.5 MW wind turbines as a replacement for its Boiler 5. The wind turbines were rejected because low projected annual capacity factor and the lack of an appropriate site within MPU's service territory. MPU did not investigate the cost, potential wind resource or siting potential for a wind

generation facility near its service territory on the Niagara Escarpment. Some of the best wind capacity in Wisconsin exists along the escarpment.

Another potential renewable resource available to MPU is biomass from local wood waste or paper mill waste. The existing CFB Boiler 8 does burn some paper pellets and MPU has stated in its application that Unit 9 would offer the capability of firing additional paper pellets. The applicant has not indicated how much renewable fuel it intends to fire in the new unit. Burning from 10 percent to 20 percent renewable fuel in the new CFB Boiler could significantly reduce the environmental impact of the facility.

Other Supply Options

MPU reviewed and evaluated a wide range of supply options to meet future demand growth. These supply options included firm and non-firm power purchase contracts, new plant construction, and plant upgrades. These supply options were further screened and used to develop four alternative supply plans for detailed economic analysis. These four alternatives, summarized below, include one energy supply build option (new generating unit to supply baseload energy and capacity), two capacity build options (peaker units with non-firm energy purchases), and one no-build option (firm energy and capacity purchases).

Energy Supply Build Option (Proposed Option)

- 63.3 MW Unit 9 project.
- Retire Turbines 2 and 3, operate Boiler 5 on natural gas (reduce to approximately 7.5 MW).
- Continued operation of other MPU units without changes.
- Firm purchases from wholesale market and/or new CTs as needed.

Capacity Build Option

- Add baghouse to Boiler 5 and switch to lower priced coal.
- Continued operation of other MPU units without changes.
- Firm purchases from wholesale market and/or new CTs as needed.

Capacity Build Option

- Convert Boiler 5 to full load gas operation (15 MW).
- Continued operation of other MPU units without changes.
- Firm purchases from wholesale market and/or new CTs as needed.

No Build Option

- Firm purchases from wholesale market.
- Continued operation of other MPU units without changes.
- Operate Boiler 5 on natural gas (reduce to 7.5 MW)

The net annual cost impact for these four alternative scenarios was evaluated over the period 2002 through 2026. In this analysis, the plan with the lowest discounted costs represented the least cost capacity and

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energy supply option for MPU. The proposed CFB project, was the least cost option. The 25-year net discounted costs for the four supply plans are as follows:

<u>Supply Plan Alternative</u>	<u>25 Year Net Present Value Costs (\$ million)</u>
Energy Supply Build Option	\$301.1
Capacity Build Options (boilers, baghouses)	\$307.2
Capacity Build Option (convert Boiler 5 to gas)	\$314.5
No Build Option	\$358.5

Existing Environment of the Power Plant Site

Physical Environment

The proposed site in Manitowoc lies within the Eastern Ridges and Lowlands Physiographic province of Wisconsin. The surface and near surface deposits in the area consist of Pleistocene glacial deposits deposited 10,000 to 15,000 years ago, lake bed sediments, and recent fluvial or river and flood deposits. The bedrock geology consists of gently eastward dipping Silurian through Cambrian sedimentary rocks which are 400-550 million years old overlying Precambrian metamorphic rocks which are 550 million years old. The following descriptions of the geology and hydrogeology of the area are based on Paull and Paull (1977), Emmons (1985), Webb (1989), and Dott (1990).

Surface Geology

The surficial geology in the vicinity of the site consists of Pleistocene glacial deposits, lake bed sediments, and recent fluvial deposits. The Pleistocene deposition took place during several advances and retreats of the Lake Michigan Lobe of the Laurentide ice sheet during the late Wisconsin period approximately 14,000 to 18,000 years ago. Several till units or materials deposited by glacial ice, in stratigraphic succession from youngest to oldest, were deposited in the area during the glacial epoch: the Two Rivers Till, Manitowoc Till, Shorewood Till, and the Wadsworth Till. These tills are mixtures of clays, sands, silts, and gravels.

Other glacial and outwash or glacial meltwater stream sediments are comprised of mixtures of clay, silt, sand, gravel and boulders, with intermittent deposits of stratified sand and gravel. Lake silt and clay deposits, as well as organic layers, are present in various thicknesses throughout the region. The thickness of the surficial deposits in the region ranges from less than 50 to more than 150 feet thick. The estimated thickness of the deposits in the area of the site is about 100 feet and consists primarily of till.

Bedrock Geology

The bedrock geology consists of gently eastward dipping Silurian through Cambrian sedimentary rocks overlying Cryptozoic metamorphic basement rocks. Underlying the surficial deposits descending stratigraphically are Silurian dolomites, Ordovician shales, dolomites and sandstones, and Precambrian basement rocks.

The Silurian deposits are a massive, light-gray dolomite with minor amounts of chert and localized shaly areas. A well developed horizontal bedding plan fracture system has been formed within the unit. The thickness of the deposit in the area of the subject site is estimated to be almost 700 feet.

The Ordovician rocks are comprised of the Maquoketa shale, Galena dolomite, Decorah shale, St. Peter sandstone, and the dolomitic Prairie du Chien Group. The Maquoketa shale contains beds of dolomite and is locally dolomitic. The Galena dolomite, Decorah shale and the Platteville formations are similar in composition, comprised of fossil containing dolomite with thin beds of dolomitic shale, and are often undifferentiated. The St. Peter sandstone is fine-to-medium grained and dolomitic in parts. The Prairie du Chien Group is generally described as hard, cherty dolomite, with intermittent shale beds.

The sedimentary Cambrian deposits are comprised of the Jordan sandstone and St. Lawrence dolomite members of the Trempealeau Formation, the Franconia, Galesville, Eau Claire, and Mount Simon sandstones. The sandstones are generally fine-to-medium grained, dolomitic, locally glauconitic, with some siltstone and shale beds.

The metamorphic Precambrian crystalline basement rocks consist of granites, quartzites, gneisses, and schists.

Soils

The soils at the site consist mainly of Shiocton and Nichols (N_sB), a very fine sandy loam. Another fine sandy loam, also called Nichols (N_sC_2) may also exist at the southeast corner of the site. The Shiocton series consists of somewhat poorly drained, moderately permeable soils in drainage ways in glacial lake deposits. These soils formed in loamy, waterlaid deposits and are on gentle slopes ranging from 0 to 3 percent.

The Nichols (N_sB) are gently sloping and are moderately well-drained. The surface layer is dark brown, very fine sandy loam, about eight inches thick. The soil is only fairly or poorly suited to building site development. Artificial drainage is needed around footings to keep basements from becoming wet.

The Nichols (N_sC_2) is fine sandy loam, sloping from 6 to 12 percent. This is a well-drained soil, with a dark brown surface layer about six inches thick. The soil is fair or good potential for building site development and sanitary facilities.

Water Resources

Surface Water

The existing MPU Power Plant is located on the western shore of Lake Michigan in the city of Manitowoc. The major surface waters in the vicinity include the Manitowoc River and Lake Michigan.

Manitowoc River

The Manitowoc River is characterized as a warm-water fishery. It begins in Fond du Lac and Calumet Counties and flows eastward through central Manitowoc County and into Lake Michigan in the city of

Manitowoc. The mean river flow over the past 20 years has been 151,000 gallons per minute (gpm), with a maximum recorded flow of 900,000 gpm.

The predominant land uses in the watershed are agriculture and forestry, although urbanization is occurring. Several dams are located on the Manitowoc River. Non-point source water pollution is a major issue in the basin with soil erosion and excess nutrients impacting fish, wildlife and water quality. The Manitowoc River also has a problem with contamination from poly-chlorinated biphenyls, especially in the Manitowoc Harbor area. The lower Manitowoc River has undergone extensive alteration, including filling behind bulkhead lines and dredging. The DNR uses the lower stretches of the river to stock thousands of trout and salmon each year for its Lake Michigan fisheries program.

Native Aquatic Species

Limited information on native species is available in the lower section of the Manitowoc River. Fyke net surveys in the late 1970s and mid-1980s identified numerous native species including northern pike, smallmouth bass, channel catfish, white and red horse suckers, yellow perch, black crappie, pumpkinseed, rock bass, trout-perch, common shiner, common carp, bullhead, rainbow smelt, and stocked species including rainbow, brook and brown trout. The Manitowoc River is an important location for trout and salmon stocking, as well as for spawning sites for migrations of trout, suckers, alewife and smelt (Hogler, 1999).

Fish Consumption Advisories

Several fish species are listed in the Fish Health Advisory with consumption restrictions (DNR 1999). The 2000 Fish Advisory lists the Manitowoc River, from the mouth to the dam at Clarks Hills, as containing certain fish species that are advised to be eaten either, (1) no more than one meal per week, (2) no more than one meal per month, (3) no more than one meal every two months, or (4) not to be eaten. The Advisory lists channel catfish, smallmouth bass and northern pike as being under this advisory for varying consumption rates.

The 2000 Fish Advisory for Lake Michigan and its tributaries up to the first dam, including the Manitowoc River, lists numerous species, including Chinook salmon, Coho salmon, brown trout, lake trout, rainbow trout, yellow perch, whitefish, chubs, and smelt. The Advisory does not list Lake Michigan or the Manitowoc River in the mercury advisory section.

Lake Michigan

Lake Michigan is the second largest Great Lake in volume and the only Great Lake located totally within the United States. The northern part, including the Manitowoc area, is in the colder, less developed upper Great Lakes region. The more temperate southern basin is the most urbanized area in the Great Lakes system and includes the Milwaukee and Chicago metropolitan areas.

The Lake Michigan drainage basin covers more than 45,000 square miles and drains parts of four states including Wisconsin, Illinois, Indiana, and Michigan. Lake Michigan discharges into Lake Huron through the Straits of Mackinaw at a rate that allows for a complete change of water about every 100 years. The lake forms a link in a waterway system that reaches east to the Atlantic Ocean and south through the Mississippi

River to the Gulf of Mexico. Among the large rivers that enter the lake are the Fox and the Menominee Rivers in northeast Wisconsin, the St. Joseph, the Kalamazoo, and the Grand Rivers in southwest Michigan.

Resources of the Lake Michigan Basin

The Lake Michigan region supports a wealth of biological diversity, including many plant and animal species found nowhere else in the world. Lake Michigan basin's sand dunes, coastal marshes, tall grass prairies, savannas, forests, and fens all provide essential habitats for this diversity of life. Agricultural and industrial products such as iron ore, coal, limestone, metals, petroleum, coke, and chemicals are derived from the basin's resources. Lake Michigan supports large commercial and sport fishing industries, provides industrial process and cooling water, and water for agricultural irrigation. Fleets of freighters pass over the Lake carrying bulk commerce items. Lake Michigan also serves as a source of drinking water for many cities, including Manitowoc.

Aquatic Species

Lake Michigan is considered a cold-water fishery by the DNR for its ability to support cold-water species as well as cool-water species. The cold-water species include four trout species, Brook, Brown, Rainbow and Lake trout, and two salmon species, Chinook and Coho salmon, and numerous pelagic forage species. The cool-water species include numerous game fish, pan fish and minnow species mainly in the near-shore or harbor areas. Brook trout and Lake trout (both of which are actually chars, of the genus *Salvelinus*, not trout, genus *Salmo*) are indigenous to Lake Michigan. The other trout and all of the salmon are non-native, non-indigenous fish introduced in the past century. These native and non-native fish were stocked after the collapse of native stocks, and are important to maintaining an ecological balance in the Lake between predators and forage fish, as well as being the basis of a multi-million dollar fishery.

The Lake Michigan water resource is a very complex and diverse ecosystem. In general, the cold-water fishes including salmon, trout, and pelagic forage species use the near-shore areas or tributaries for spawning, rearing or feeding purposes. Water level and temperature conditions are important factors in the utilization of the near-shore areas and tributaries by the cold-water species.

The cool-water species also generally utilize the near-shore area and tributaries and do not normally use the deeper Lake Michigan basin or open water areas. DNR fisheries staff indicates that the near-shore areas contain yellow perch, smallmouth bass, northern pike and various minnow or forage species, as well as periodic coldwater species. Water temperature, wind direction and the presence of forage species are factors influencing the use of the near-shore areas.

Reefs, Spawning Areas, and Other Important Habitat

The near-shore area of Lake Michigan near the proposed site is a relatively shallow, flat area with a very gradual slope of approximately six feet in depth in over 1,000 feet of distance. Unfortunately, there is very little information available on potential habitat at this location. A review of information from the Marine Studies Center, Sea Grant Institute at the University of Wisconsin - Madison indicates that five spawning areas were identified in the Manitowoc and Two Rivers area. This information indicates that no spawning areas were identified within four miles north or south of the proposed site for the new CFB unit.

Air Pollution Permitting

MPU has submitted a PSD permit application for a new 55-megawatt boiler to the DNR under chs. NR 405, NR 406, Wis. Adm. Code and the Code of Federal Regulations, 40 CFR S. 52.21. The DNR has yet to declare the application complete.

This section of the EIS describes the numerous aspects of air pollution regulation as related to the proposed project.

Applicable Air Quality Standards

The federal Clean Air Act requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for air pollutants that could adversely impact human health or welfare. Primary standards have been established to protect public health, while the secondary standards have been established to protect public welfare and the environment. NAAQS have been established for six “criteria pollutants.” These pollutants are sulfur dioxide (SO₂), NO_x, carbon monoxide (CO), particulate matter less than ten microns in diameter (PM₁₀), ozone (O₃), and lead (Pb).

EPA describes an area as “non-attainment” if the ambient air quality standard for one or more criteria pollutants is not met.

The Clean Air Act Amendments of 1972 resulted in the establishment a national permitting program for all areas of the country in 1977. Areas in which the existing air quality meets the NAAQS are subject to the rules of the Prevention of Significant Deterioration program. Areas in which the existing air quality does not meet the NAAQS are subject to non-attainment area New Source Review (NSR) requirements. The analysis as to whether or not an area meets the NAAQS is done on a pollutant-by-pollutant basis.

Table 3-1 PSD applicability threshold level analysis

Pollutant	Boiler 9 Emissions increases (tpy)	Boiler 5 Emission Reduction (tpy)	Project Net Emission Changes (tpy)	PSD Significant Emission Threshold (tpy)
Carbon Monoxide	427.1	0	427.1	100
Nitrogen Oxide	324.6	0	324.6	40
PM	78.3	346	-258.3	25
PM ₁₀	78.0	112	-25	15
Sulfur dioxide	847.9	822	25.9	40
Volatile organic compounds (VOC)	37.0	0	37.0	40
Lead	0.313	0.69	-0.377	0.6
Mercury	0.005	0.0015	0.0035	0.1
Beryllium	0.001	0.015	-0.015	0.0004
Fluorides (as HF)	0.364	2.45	-2.09	3
Sulfuric Acid Mist	12.7	12.3	0.4	7

The state of Wisconsin regulates air pollutant emissions under Wis. Admin. Code Chapters 400-499 and has adopted the EPA primary and secondary standards. All counties in Wisconsin are classified either as “attainment” (their ambient air has less of that pollutant than the standard allows) or “non-attainment” (their ambient air has more of that pollutant than the standard allows). In addition, Wisconsin has a secondary or welfare-based standard for particulate matter (PM).

The area of the state that would include the MPU is presently classified as moderate non-attainment for ozone. The area is presently classified as attainment for all other criteria pollutants. The project is classified as a major modification to the existing MPU major stationary source for PSD. Therefore, a PSD permit application is required for all pollutants emitted by the MPU above the PSD significant emission levels. Table 3-1 compares the potential future emissions from Boiler 9 and the expected emission decreases from Boiler 5 to the PSD significant emissions thresholds to determine PSD applicability.

State requirements (Wisconsin)

Opacity

According to Wis. Admin. Code ch. NR 431, the opacity from the proposed CFB Boiler shall not be greater than 20 percent except during cleaning periods for combustion equipment. During those cleaning periods, emissions are allowed to exceed 20 percent but may not exceed 80 percent for five minutes in any one hour.

Control of Nitrogen Compound Emissions

As specified in Wis. Admin. Code § NR 428.04, NO_x requirements and performance standards for new or modified sources apply to emission units located in Kenosha, Milwaukee, Ozaukee, Racine, Washington, or Waukesha County that are constructed or that undergo a major modification after Feb. 1, 2001. The proposed CFB boiler is not subject to these requirements because it will not be located in any one of the counties identified in the rule.

Particulate Matter

The new CFB boiler is subject to Wis. Admin. Code § NR 415.06 and would have an allowable emission rate of 0.1 pound per million British thermal units (mmBtu), for fuel burning sources that have a heat input of greater than 250 mmBtu/hr and emit PM. The maximum allowable particulate emission rate from the CFB boiler would be set at 0.03 lb/mmBtu.

The fugitive material handling sources are subject to Wis. Admin. Code § NR 415.05, with an allowable emission rate of 0.2 lb/1,000 lb exhaust gas. This level is equivalent to a grain loading of 0.1 gr/ft³ at a temperature of 68°F.

Hazardous Air Pollutants

The state of Wisconsin regulates the emissions of hazardous air pollutants under Wis. Admin. Code ch. NR 445. NR 445 exempts fuels that meet the definition of a "Virgin Fossil Fuel." Virgin fossil fuels are defined as any solid, refined liquid or refined gas fossil fuels with Btu contents greater than 7,000 Btu/lb that are not blended with reprocessed or recycled fuels. Natural gas, liquid petroleum gas, fuel oil, distillate fuel

oil, gasoline, and diesel fuel are Group 1 virgin fossil fuels. Coal and residual fuel oil would be Group 2 virgin fossil fuels.

The primary fuel for the CFB boiler would either be coal, petroleum coke or a blend of the two. The hazardous air pollutant emissions from Group 2 virgin fossil fuels vented from a stack which has downwash minimization stack height, or a height approved by the DNR, are exempt from NR 445 requirements. Therefore, the proposed boiler would be exempt from NR 445 rules while combusting coal alone, but would be subject to NR 445 while burning petroleum coke/or a petroleum coke/coal blend.

Ammonia might be emitted as a result of ammonia “slip” from the SNCR system for NO_x emission control. Ammonia is a regulated hazardous air pollutant (HAP) under NR 445, Table 1. The proposed ammonia emission limit from the boiler is 25 ppm, which is equivalent to 15.8 pound per hour from the CFB stack. The threshold value for stacks in excess of 25 feet for ammonia in Table 1 of NR 445 is 6.28 pounds per hour. Since the CFB boiler may emit ammonia in excess of the table value, NR 445 requires that dispersion modeling be performed to demonstrate that the maximum ambient concentrations of ammonia do not exceed 2.4 percent of the threshold limit value (TLV) established by the American Conference of Governmental and Industrial Hygienists (ACGIH). The DNR is currently conducting the modeling analysis to ensure that the proposed project would meet the NR 445 requirements.

Biological Environment

The site for the proposed CFB unit lies completely within the existing plant boundary, which has been in existence since 1914. No vegetation or animal communities are observed at the site. In addition, a search of National Heritage Inventory (NHI) and consultation with the Bureau of Endangered Species at the DNR resulted in no detection of endangered or threatened species at the site.

Visual Landscape

Existing Landscape

The landscape surrounding the site is a mixture of industrial, public and private residences. The proposed new unit would be placed at the east end of an existing building that currently has four steam boilers. No significant changes in visual landscape are expected to occur due to the addition of Unit 9.

Existing Lighting

The existing lighting in the area consists of MPU’s power plant, the adjacent high school, MPU municipal water treatment facility, nearby public building, residence yard and house lights, and street lights.

Noise

Terminology and measurements

Everyday sounds are comprised of sound waves of many different frequencies. The frequency of a sound wave is measured in Hertz (Hz), with one Hz equal to one sound wave cycle per second. While the

frequency range of human hearing is generally accepted to be 20 to 20,000 Hz, the ear is not equally sensitive to sounds through that entire range. The human ear is most sensitive to sound in the 500 to 8,000 Hz frequency range. However, it becomes increasingly sensitive to lower and higher frequencies as the intensity of the sound level increases.

Sound levels are measured with a device called a sound level meter in units known as decibels (dB).

When sound level measurements are taken, it is customary to use weighting systems in conjunction with the sound level meter to approximate the asymmetrical frequency sensitivity of human hearing. Three internationally standardized weighting characteristic curves, known as A, B, and C, are generally used for sound measurements. When sound levels are measured using a weighting characteristic, the measurements are designated by adding the characteristic curve letter after the abbreviation for decibels, such as 58 dBA.

The most commonly used weighting curve is characteristic A. The A weighting scale takes into account the human ear's variable sensitivity to frequency. The A characteristic deemphasizes both very low and very high frequency sound while leaving unaffected the mid-frequency ranges most sensitive to human hearing. The C characteristic does not filter out as much of the lows and highs as does the A characteristic. It approximates human hearing at higher sound levels and has been used, for example, for traffic noise surveys in noisy areas. The B characteristic filter is intermediate between A and C weighting. The B characteristic is rarely used.

Noise Impacts and Descriptors

Noise level scales (as measured in dB) are logarithmic rather than linear. This means that the decibel levels emitted by two different noise sources cannot simply be added together to determine the combined effect of those noise sources. As a generally accepted rule of thumb, two noise sources emitting sound at the same dB level would have a combined noise impact of 3 dB greater than either source alone. The same rule can be applied to weighted sound levels.

As a point of reference, sound experts generally agree that the human ear can detect changes in dBA roughly as follows:

- A change of 3 dBA or less is barely perceptible.
- A change of 5 dBA is perceptible.
- A change of 10 dBA is perceived as either twice or half as loud.

Noise also decreases with distance from the source. Assuming there are no obstructions between the noise source and receptor, the noise from a single source decreases by approximately 6 dBA for every doubling of the distance. For a noise source that is a continuous line, such as a highway, the noise levels will generally decrease by about 3 dBA with a doubling of the distance from the source.⁵ In addition to distance, noise levels can be affected by intervening structures or objects such as buildings, trees, and shrubs.

⁵ B. B. Marriott, Practical Guide to Environmental Impact Assessment.

Sound levels experienced in most natural and human environments do not remain constant but can vary considerably throughout the day. Because of this fact, a single sound level cannot adequately describe the ambient sound environment. A variety of noise descriptors are typically used in order to accommodate the time-varying or temporal characteristic of environmental sound. One type, called percentile descriptors, is commonly used in noise studies. These descriptors identify A-weighted sound pressure levels that are exceeded for specific percentages of time within a noise monitoring period. Typically, the levels reported include those exceeded 10 percent, 50 percent, and 90 percent of the time and are reported as L_{10} , L_{50} , and L_{90} . The L_{90} , or residual noise level, is defined as the nearly constant, low level of noise that is found in the environment and represents the lowest sound levels recorded during a monitoring period. The L_{10} is often called the intrusive noise level and represents the highest sound levels occurring in the area during the monitoring period. Another descriptor is the L_{eq} or equivalent sound level. The equivalent sound level uses the average A or C-weighted sound levels recorded. The L_{eq} is a better overall descriptor because it combines sound level, frequency, and temporal characteristics into a single-value. The EPA has encouraged the use of the L_{eq} for representing environmental sound levels.

Applicable local noise ordinances

The city of Manitowoc noise limitations for areas zoned I-1, where the power plant is located, are found in Section 15.33, (3) "Limitations on above permitted uses." The limitations are as follows:

1. The volume of sound inherently or recurrently generated shall not exceed 70 decibels at the zoning district boundary line.
2. The ground vibration inherently or recurrently generated shall not be perceptible, without instruments at any point of boundary line of the lot on which it is located.

Existing noise environment

In accordance with the PSC's Noise Assessment Measurement Protocol, MPU commissioned an ambient noise level survey that was completed on October 31, 2002, in the area of the project and the surrounding neighborhood. Sound level measurements were taken on October 17 and 18, 2002. They were collected to establish background levels prior to construction and operation of the proposed project. Overall sound levels (dBA) and octave band sound levels were taken in 10 minute intervals, during morning (6:00-8:00 a.m.), midday (12 noon-2 p.m.), evening (6:00-8:00 p.m.) and late night hours (10 p.m.-12 a.m.).

The readings were taken at six locations near the site, as identified in Figure 3-1 and Table 3-2 below.

Figure 3-1 Noise contours and measurement points



Table 3-2 Measurement points for determining ambient noise

Site	Location	Distance from Plant (feet)
1	Curb adjacent to MPU parking lot at 7th and Madison St.	680
2	Parking lot across from school at 1221 7th St.	1,090
3	8th St. and Columbus	430
4	908 Columbus St.	930
5	East side of track at Track and Field Area	1,220
6	West of coal handling area at east side of Lincoln School	470

Octave band (L_n) unweighted sound levels were measured in addition to A-weighted and C-weighted decibel levels and are shown in Table 3-3 below.

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Table 3-3 Statistical sound level measurements

Time	Site	Location	Leq	Lmax	L01	L10	L50	L90	Lmin	Calc dBA	Car Count	Com 1
12-2 p.m.	1	7 th and Madison	62.9	82.0		63.9	55.5	49.0	46.3	52.8	50	High School noon break
12-2 p.m.	2	1221 7 th St.	49.5	72.5	62.4	47.4	44.7	43.7	42.4	43.5	4	
12-2 p.m.	3	8 th and Columbus	59.1	77.7	68.5	60.7	55.5	54.3	52.7	54.1	19	
12-2 p.m.	4	908 Columbus	56.2	75.3	67.2	59.1	49.7	45.2	42.1	43.6	15	
12-2 p.m.	5	Track and field area	48.5	54.4	51.1	49.5	48.3	47.4	45.8	44.2	0	Lake surf audible
12-2 p.m.	6	East side of school	53.4	55.3	54.2	53.8	53.4	53.0	52.3		0	AC cycling every 3-4 min.
6-8 p.m.	1	7 th and Madison	52.7	70.8	62.7	55.2	48.9	46.2	44.9	48.3	19	No wind, very humid
6-8 p.m.	2	1221 7 th St.	61.3	77.5	74.9	61.3	50.6	45.1	42.2	45.8	4	No wind, very humid
6-8 p.m.	3	8 th and Columbus	55.2	61.9	58.9	56.6	54.8	53.6	52.6	52.8	9	No wind, very humid
6-8 p.m.	4	908 Columbus	58.9	80.2	69.2	61.2	53.2	50.1	47.1	50.4	19	No wind, very humid
6-8 p.m.	5	Track and field area	48.3	63.2	52.5	49.3	47.9	46.9	45.3	46.8	0	No wind, very humid
6-8 p.m.	6	East side of school	46.8	49.1	48.3	47.8	47.0	45.4	43.7	45.1	0	No wind, very humid
10 p.m.-12 a.m.	1	7 th and Madison	53.7	76.6	65.6	50.1	46.3	45.7	44.5	48.3	3	One loud car
10 p.m.-12 a.m.	2	1221 7 th St.	44.5	63.9	58.1	44.6	43.0	42.1	40.9	42.3	2	
10 p.m.-12 a.m.	3	8 th and Columbus	50.9	61.6	57.1	51.6	50.3	49.5	48.4	50.7	3	
10 p.m.-12 a.m.	4	908 Columbus	51.1	67.0	62.9	53.7	45.1	41.2	39.2	43.7	3	Cross traffic not counted
10 p.m.-12 a.m.	5	Track and field area	43.4	52.0	47.7	44.1	43.2	42.3	41.1	43.5	0	Only surf noise
10 p.m.-12 a.m.	6	East side of school										
6-8 a.m.	1	7 th and Madison	49.5	67.3	60.9	48.6	46.5	45.7	44.5	47.3	5	No wind, heavy fog
6-8 a.m.	2	1221 7 th St.	50.7	75.1	61.3	48.0	44.5	43.6	42.6	47.0	1	
6-8 a.m.	3	8 th and Columbus	53.2	67.5	58.2	54.2	53.1	50.8	49.7	53.7	4	
6-8 a.m.	4	908 Columbus	58.1	74.8	69.1	61.8	52.3	47.7	46.0	51.9	15	Heavy cross traffic
6-8 a.m.	5	Track and field area	52.0	70.9	57.0	52.9	51.1	50.1	48.3	49.8	9	Planes, fog horns, cars
6-8 a.m.	6	East side of school	58.2	80.1	72.2	56.4	51.3	49.4	48.1	53.5	4	Trucks, etc., plant noise barely distinguishable

Table 3-3 shows some of the ambient sound measurements taken on October 17 and 18, 2002. The table lists the L_{eq} (equivalent continuous sound level - a measure of average energy representing the steady state noise level during the measurement period) and the L_{10} , L_{50} , and L_{90} (sound levels exceeded 10 percent, 50 percent, and 90 percent of the time during the measurement period), all reported in dBA. The equivalent continuous sound levels ranged between 58.2 dBA at East High School and 49.5 dBA on 7th and Madison Street in the early morning hours, between 62.9 dBA on 7th and Madison Street and 48.5 dBA at Track and field area in the afternoon hours, between 61.3 dBA at 1221 7th Street and 46.8 dBA at East High School in the evening hours.

Other Environmental Factors

Archeology

In accordance with Wis. Stat. § 44.40, the site was searched for the presence of archaeological site. According to Wisconsin Historical Society (WHS) listings, there are two shipwrecks in the Manitowoc River, both in Section 29. One is the “C.S. Davis” (MN-0408), and the other is the “Dispatch” (MN-0411).

Municipal Services

The city of Manitowoc currently provides fire protection, emergency medical services, police services, and waste pick-up services for the MPU.

Current Land Use, Ownership and Zoning

The power plant site currently has four steam boilers, located in an old building. The new unit would be placed at the east end of this building.

The land has been owned by MPU dating back to early 1900s. No additional land purchases are necessary for the expansion of the plant.

The site is already zoned I-1, a designation for light industrial district that also allows placement of power plants.

Publicly Owned Lands

There are two municipal parks located within one-half mile of the project site—Red Arrow Park and Washington Park.

Red Arrow Park is located at 1931 South 9th Street on the city’s south side. The park is 26.65 acres and supports a number of recreational activities.

Washington Park is located in the 1100 block of Marshall Street on the city’s south side. This park is situated on a 3.72-acre site and features MetroStage, a basketball court, restrooms, a playground area, and picnic areas.

Schools, Day Care, Nursing Homes, Hospital and Residences

As shown in the table below, there are four schools, one hospital, one day care center and one nursing home within one-half mile of the project site. There are also approximately 1,200 private property owners who reside within one half mile of the proposed site.

Table 3-4 Schools, day care, hospitals and nursing homes

Name	Type	Address	Distance (feet)
Jefferson	Elementary School	1450 Division St. Manitowoc, WI 54220	2,272
Lincoln	Senior High School	1433 South 8 th Street Manitowoc, WI 54220	Adjacent
St. Francis Xavier	Elementary School	1418 Grand Avenue Manitowoc, WI 54220	2,570
First German	Evangelical Lutheran School	1025 South 8 th Street Manitowoc, WI 54220	1,346
None	Hospitals	NA	NA
None	Day Care Centers	NA	NA
None	Nursing Homes	NA	NA

Local Demographics

Demographics data from the U.S. Census Bureau for the city of Manitowoc, Manitowoc County, and the state of Wisconsin is delineated below. According to the U.S. Census Bureau, the city of Manitowoc has a total population of 34,053. The population is essentially 98.1 percent white, 1.3 percent Hispanic or Latino, and less than 1 percent American Indian or Alaskan native, black or African American, Asian, or other minorities.

Table 3-5 Demographics data from the U.S. Census Bureau for the city of Manitowoc, Manitowoc County, and the state of Wisconsin

	Wisconsin	Manitowoc County	City of Manitowoc
Total Population	5,401,906	82,618	34,053
White Persons	88.9%	95.9%	98.1%
Black or African American	5.7%	0.3%	0.2%
American Indian	0.9%	0.4%	0.2%
Asian/Pacific	1.7%	2.0%	0.5%
Hispanic or Latino	3.6%	1.6%	1.3%

Chapter 4

Environmental Impacts of the Proposed Project

Physical Environment

Since the new unit would be located completely within an existing building, no changes are expected either in the geology or the topography of the site.

The site, sloping from west to east, has already been graded and developed, and the installation of the new unit would require little or no grading. In addition, since the site lies completely within the existing plant boundary, there would be no long-term soil impact at the site.

During construction soils would be graded and stockpiled for removal. After construction, some topsoil would be spread over the areas of the site that would remain vegetated. These areas would be seeded to avoid erosion. Construction would follow an erosion control plan designed to minimize soil loss and erosion.

Water Resources Impact

Well or Municipal Impacts

Water for all potable and process plant requirements would be supplied from the MPU municipal water system. The water treatment plant is located adjacent to the power plant. There is a dedicated supply line from the water treatment plant to the power plant with sufficient capacity to supply the net additional water requirements for the proposed project. The expected uses and discharges of municipal water are shown below. The daily values are based on 100 percent unit load operation for 24 hours. The monthly and annual values are based on an 85 percent capacity factor.

Water Usage and Source – Surface Water

Water from Lake Michigan would be used for non-contact, once-through cooling of the steam turbine condenser. The estimated daily, monthly and annual averages for once-through flows are provided below. The daily values are based on 100 percent unit load operation for 24 hours. The monthly and annual values are based on an 85 percent capacity factor.

Table 4-1 Water use and discharge for the proposed project

Uses	Gallons per Day	Million Gallons per Month	Million Gallons per Year
Demineralized water	79,000	2.0	24.6
Potable water	2,900	0.1	0.9
Misc. plant use	29,000	0.7	8.9
Total water use	110,900	2.9	34.4
Discharges	Gallons per Day	Million Gallons per Month	Million Gallons per Year
Losses to atmosphere	14,000	0.4	4.4
Discharge to sewer	65,000	1.7	20.2
Potable water	2,900	0.1	0.9
Condensate (non-return)	29,000	0.7	8.9
Total discharges	110,900	2.9	34.4

Table 4-2 Once-through cooling system water use (millions of gallons)

	Daily	Monthly	Annual
Lake Water	52.5	1,358	16,294

The existing water intake system operated by MPU for the MPU Power Plant and water drinking supply would be used to supply this water. MPU does not anticipate any physical changes to the water intake structures to accommodate this new unit.

Since the proposed increase in water withdrawal from Lake Michigan will not result in a water loss greater than 2.0 million gallons, a water loss approval is not required pursuant to Wis. Admin. Code s. NR 142.06.

Water Usage and Discharge – Surface or Municipal

Water from Lake Michigan used for non-contact, once-through cooling of the steam turbine condenser would be pumped through the steam condenser and returned back to the lake. The estimated daily, monthly and annual averages for the circulating cooling water are summarized above. These circulating cooling water flows are based on a design temperature rise for the water of 20°F.

The discharge of non-contact, once-through cooling water from the existing MPU Power Plant is addressed by WPDES Permit No. WI-0027189-6. The permit will be modified to cover the proposed increase in discharge.

The existing MPU Power Plant discharges circulating cooling water at the shore of Lake Michigan near the end of Columbus Street. Directly north of this outfall location is a city park and beach. For many years, this beach, called the Warm Waters Beach, has been a gathering place for Manitowoc residents on the shore of

Lake Michigan. The circulating cooling water outflow from MPU's power plant tempers the normally chilly lake water temperature enough for seasonal enjoyment of water activities.

Wastewater Outfall Structures

The existing cooling water intake system extending into Lake Michigan would not be modified for this project. The circulating cooling water for the project would be discharged from a new outfall structure located adjacent to the existing MPU circulating cooling water located at the end of Columbus Street. This outfall would be an on-shore outfall, with an estimated diameter of 36 inches. Since the current outfall for the MPU Power Plant is an established bulkhead on the shore of Lake Michigan, the installation of this outfall structure is not anticipated to require a waterway permit by the DNR. Approval by the DNR of construction plans for the outfall and discharge monitoring equipment is required.

Wastewater and Storm Water Treatment Facilities

The stormwater run-off characteristics for the MPU Power Plant site would not be affected by the new proposed project. The existing stormwater collection and treatment systems would continue to be used. The Unit 9 addition would be enclosed in an existing building.

Storm Water Management Plans

The existing Storm Water Pollution Prevention Plan (SWPPP) would be updated if the solid fuel storage area is expanded.

Air Quality Impacts

Expected Projected Emission

MPU is proposing to eliminate the solid fuel firing capabilities of Boiler 5. In the future Boiler 5 would be used only during peak demands and would fire only natural gas. The emission reductions from shutting down the solid fuel firing capability would be used to limit the need for a PSD review for particulate matter, sulfur dioxide and hazardous air pollutant emissions, and a non-attainment area New Source Review for VOC.

Table 3-1 compares the potential future emissions from Boiler 9 and the expected emission decreases from Boiler 5 to the PSD significant emission thresholds to determine PSD applicability. (See page 32.)

Based on Table 3-1, the proposed project is classified as a major modification of a major source under both the Operations Permits program in Wis. Admin. Code ch. NR 407, and the New Source Review programs under Wis. Admin. Code chs. NR 405. Because the facility belongs to one of the 28 pre-designated categories and would have potential emissions of at least one of the criteria pollutants in amounts greater than 100 tpy, it must be subject to PSD review. Table 3-1 also shows that CO and NO_x would both be emitted in quantities in excess of the PSD significant levels under Wis. Admin. Code § NR 405.02(27)(a),

Table A. As a result, these pollutants are subject to the control technology review requirements of Wis. Admin. Code § NR 405.08.

Prevention of Significant Deterioration

The major elements of a PSD review include:

- a. Control Technology Review (Wis. Admin. Code § NR 405.08)
- b. Air Quality Analysis (Wis. Admin. Code § NR 405.11)
- c. Source Impact Analysis (Wis. Admin. Code § NR 405.09)
- d. Additional Impacts Analysis (Wis. Admin. Code § NR 405.13)

Control Technology Review

One of the requirements of the PSD program is that the BACT be installed for all pollutants regulated under the Act that would be emitted in significant amounts from new major sources or modifications of existing major sources. The PSD requirements require the application of BACT to each source of emissions subject to PSD review. The BACT is determined based on what controls have recently been permitted or are in operation at similar facilities. All new major stationary sources must apply BACT for each regulated air contaminant that they would have the potential to emit in significant amounts.

Top-down approach to BACT

Any control technology BACT review must include an evaluation of environmental, energy, technical, and economic impacts. Currently, the EPA is recommending a “top-down” approach in conducting a BACT analysis. The first step in the top-down BACT approach is to determine the most stringent control available for a similar source or source category. If it is shown that the level of control is technically or economically infeasible for the source in question, then the next level of control is determined and similarly evaluated. This process continues until the technology under consideration cannot be eliminated by any substantial or unique energy, environmental, or economic impact.

The energy impact analysis estimates the direct energy impacts of the control alternatives in units of energy consumption. If possible, the energy requirements for each control option are assessed in terms of total annual energy consumption. The net environmental impact associated with a control alternative is considered through the use of computer driven air dispersion modeling analyses. The economic impact of a control option is assessed in terms of cost effectiveness.⁶ Once the energy, environmental, and economic impacts are assessed, the level of control achieved through the use of the technology being evaluated is determined to be BACT.

Table 4-4 summarizes the proposed BACT limits for CO and NO_x pollutants. These pollutants were identified earlier as those above the PSD limit (see Table 3-1). This information is subject to change pending further DNR review and analysis.

⁶ The economic impacts are reviewed on a cost per ton controlled basis, as directed by the EPA's Office of Air Quality Planning and Standards (OAQPS) Cost Control Manual, Fifth Edition.

Table 4-4 BACT for CFB boiler emissions, based on MPU's permit application.

Pollutant	Proposed Control Technology (BACT)	Proposed Limit
CO	Good combustion practices	0.15 lb/mmBtu ⁷ 97.5 lbs/hr
NO _x	Selective non-catalytic reduction (SNCR), good combustion practices	0.11 lb/mmBtu

New Source Performance Standards

Section 111 of the Clean Air Act establishes a regulatory scheme for controlling emissions of criteria air pollutants from identified source categories. Any construction or reconstruction of a source for which a New Source Performance Standard (NSPS) has been set is subject to that standard if construction or reconstruction occurs on or after the date the standard was proposed by the EPA. The requirements of 40 CFR 60 are the NSPS for new or modified units. Either NSPS set the base, or BACT minimum control requirements set the base of emission control if BACT is more stringent. NSPS requirements are discussed below.

The following general NSPS requirements apply (under 40 CFR Part 60, Subpart A, and Wis. Admin. Code ch. NR 440) to any affected emission unit that is subject to a specific NSPS: notification and recordkeeping, performance tests, compliance with standards and maintenance requirements, and monitoring. In addition, there are more specific requirements for CFB boilers, coal handling and storage, and limestone handling and storage.

CFB boilers. The CFB boilers would be subject to NSPS Subpart Da because they are electric utility steam generating units with heat inputs greater than 250 mmBtu/hr. The applicable NSPS Subpart Da emission limitations are summarized in Table 4-5.

Table 4-5 NSPS emission limits for CFB boiler

Pollutant	NSPS limit	Reduction Requirements	Averaging period
PM	0.03 lb/mmBtu*	99 percent	-
Visible emissions	20 percent opacity	-	-
SO ₂	-	-	-
Coal	1.2 lb/mmBtu	90 percent **	30 day rolling average
Pet Coke	.12 lb/mmBtu	90 percent**	-
NO _x	1.6 lb/MWh	-	30 day rolling average

* The particulate emission standard under Ch. NR 440.20 does not include condensable particulate matter.

** The NSPS limit varies depending upon fuel sulfur content, with a 90 percent reduction and 1.2 lb/mmBtu limitation or a 70 percent reduction when emissions are below 0.60 lb/mmBtu.

⁷ The acronym "lb/mmBtu" stands for "pounds per million Btu."

Coal handling and storage

The coal handling and storage operations would be subject to Subpart Y and NR 440.42. For these operations, NR 440.42 would prohibit visible emissions of 20 percent opacity or greater from any coal processing and conveying equipment, coal storage system (except open storage), or coal transfer and loading systems.

Limestone handling and storage

The limestone materials handling and storage operations, with the exception of the open storage piles and railcar or truck dumping operations, would be subject to Subpart 000 and NR 440.688. These limitations are summarized in Table 4-6 below. The acronyms “gr/acf” and “gr/dscf” indicated “grains per actual cubic feet” and “grains per dry standard cubic feet,” respectively.

Table 4-6 MPU operations related to limestone handling and storage, emission limits required under NSPS for each

Operation	NSPS Emission Limits
Limestone silos and receiving hoppers	0.022 gr/acf; 7 percent opacity
Limestone crusher/conveyor transfers	0.022 gr/dscf; 7 percent opacity
Limestone conveyors, transfer points, and enclosures	10 percent opacity

Air quality analysis

The PSD program requires an air quality analysis for each regulated pollutant emitted by proposed major source at levels greater than the significant emissions level. The purpose of the air quality analysis is to demonstrate, through the use of air quality dispersion models and background ambient data, that allowable emission increases from the proposed source, combined with emissions from other sources, would not cause or contribute to (a) violations of any Wisconsin Ambient Air Quality Standards (WAAQS), (b) NAAQS, or (c) any applicable maximum allowable increases over the baseline concentration in any area including PSD increments. Currently, DNR is completing its modeling analysis. The air quality analysis information in the draft EIS is based on the air pollution control permit application information provided by MPU.

Standards for ambient air quality in Wisconsin are codified under Wis. Admin. Code ch. NR 404. The proposed CFB boiler would have the potential to emit NO_x and CO in excess of the major source or significant emission threshold levels.

Source Impact Analysis

All owners and operators of new major stationary sources must demonstrate that allowable emission increases from the proposed major source, in conjunction with all other applicable emissions increases, would not cause or contribute to air pollution in violation of the NAAQS and PSD increment. The NAAQS compliance demonstration would be performed by adding the measured existing background ambient air levels to the modeled impacts from the proposed project and all other explicitly modeled sources in the NAAQS source inventory. The total modeled impact is compared to the NAAQS. The PSD

increment compliance demonstration would be performed by modeling actual emission changes that have occurred since the baseline date. The total ambient air quality concentration change would then be compared to the applicable PSD increment.

Additional Impacts Analysis

All applications for operation permits must provide an analysis of the potential impairment to (1) visibility, (2) soils, and (3) vegetation that would occur as a result of both the major source and the general commercial, residential, industrial, or other growth associated with the major source.

Visibility impact

PM, NO_x, and SO₂ emissions from this power plant have the potential to impact local and regional visibility. NO_x and SO₂ emissions react in the atmosphere to form sulfate and nitrate compounds. These compounds condense as very fine particulate matter and can cause visibility impairment.

However, nitrate and sulfate deposition rates are air pollution issues for regional or long range transport. The potential emissions of these pollutants from this power plant would be a small fraction of the annual statewide emissions as discussed below. As a result, this power plant is not expected to cause any perceptible visibility impacts to the region. In addition, a Level I screening analysis indicates that the maximum visual impacts to the nearest Class I wilderness areas, the Rainbow Lake and Seney Wilderness areas in northwest Wisconsin, would be less than the screening criteria and would not significantly impact visibility.

Impact on soil and vegetation

The primary pollutants from this proposed project are nitrogen oxides, carbon monoxide, sulfur dioxide and particulate matter. In addition, this facility would be a source of trace element hazardous air pollutants, including ammonia, mercury, and other trace elements which occur in coal, petroleum coke, and limestone.

Impacts to soil would result from deposition and incorporation of pollutants into the soil so that the soil characteristics are changed affecting the soil or plant life. Impacts to vegetation could also be more direct, resulting from deposition of pollutants onto the plants themselves or absorption of soil pollutants by the plant roots.

The primary pollutants in this case would be NO_x, CO, SO₂, and PM. In addition, this boiler would be a source of hazardous air pollutants, including ammonia, mercury, and other trace elements that occur in coal, coke and limestone. The emissions and potential concentrations of hazardous air pollutants from the project are discussed below in more detail.

Emissions from the new MPU units could cause increases in nitrate (NO₃) and sulfate (SO₄) ions deposition to soils and vegetation in the area. However, as discussed above with respect to visibility impairment, nitrate and sulfate deposition rates are regional or long range transport air pollution issues. NO_x and SO₂ emissions are normally transported many miles before deposition occurs. As a result, the proposed project is not expected to affect nitrate or sulfate deposition rates significantly.

The national ambient air quality standards include welfare standards intended to protect soils and vegetation from significant air pollution impacts. The MPU unit is being modeled, and to the extent that they demonstrate compliance with the NAAQS and PSD increment requirements, significant deposition impacts would not be expected. If the plant operated at 100 percent capacity and all its emissions were deposited uniformly within a 200-mile radius, the nitrate and sulfate deposition rates would represent small percentage increases in nitrate and sulfate deposition. Actual impacts are expected to be very small.

Acid Deposition Emissions

SO₂ Emissions

The net potential SO₂ emissions from the facility after the new boiler is constructed are 26 tons per year. For facilities of this type, normal operation is typically 75 to 90 percent of this maximum capacity. For comparison, the total Wisconsin utility emissions and total Wisconsin annual emissions can be summarized as follows.

MPU	26 tpy
Wisconsin major utilities combined	211,522 tpy
Total Wisconsin emissions	303,049 tpy

Based on the data above, the potential annual sulfur dioxide emissions from this facility would be extremely low compared to annual actual emissions from all Wisconsin utilities combined.

NO_x Emissions

The total net potential NO_x emissions expected from this facility are 325 tons per year, as shown in Table 3-1, again based on the worst case scenario. Normal plant operations would emit less. For comparison, the total Wisconsin utility emissions and total Wisconsin annual emissions can be summarized as follows.

MPU	325 tpy
Wisconsin major utilities combined	116,538 tpy
Total Wisconsin emissions	193,795 tpy

Again, the potential annual NO_x emissions from this facility would be less than 0.06 percent of the annual actual emissions from all Wisconsin utilities combined. However, the expected MPU emissions would represent new NO_x emitted into the Wisconsin atmosphere.

Federal Acid Rain Program

Title IV of the 1990 Clean Air Act Amendments established the Federal Acid Rain Program, which sets as its primary goal the reduction of acid deposition through reductions in emissions of SO₂ and NO_x, the primary causes of acid rain. The Acid Rain Program established a system to reduce total U.S. annual SO₂ emissions

by 10 million tons per year from 1980 levels. To achieve this goal, the program employs a market-based approach for controlling air pollution. In addition, the program encourages energy efficiency and pollution prevention.

The Federal Acid Rain Program affects existing utility units serving generators with an output capacity of greater than 25 MW and all new utility units. During Phase II of the program, which began in 2000, the Act sets a permanent annual ceiling (or cap) of 8.95 million “allowances” (one allowance is equal to one ton of SO₂ emissions) as the total annual allowance allocation to utilities. This cap firmly restricts emissions and ensures that environmental benefits will be achieved and maintained, even when new facilities are constructed.

The new CFB boiler would be subject to the provisions of the Federal Acid Rain Program requirements in 40 CFR Parts 72 to 76, so an acid rain permit application has been submitted. The unit would need to employ monitoring consistent with 40 Part 75 at the time that CFB boiler begins initial operation.

Hazardous Air Pollutants

Case-by-case MACT

The EPA's regulation of HAPs has, since 1996, involved a case-by-case maximum achievable control technology (MACT) as set out in 40 CFR Part 63 Subpart B. Those regulations require case-by-case determinations of MACT for each “major source” of HAPs constructed or reconstructed after an effective date which are listed by EPA and have yet to have a MACT standard promulgated. Electric utility steam generating units had been exempted from the case-by-case provisions because they were not yet added to the source category list. On December 14, 2000, the EPA added coal- and oil-fired power plants to the Section 112(c) list of HAP sources, making coal- or oil-fired electric utility steam generating units that are constructed or reconstructed after December 14, 2000 subject to the case-by-case provisions until the EPA promulgates a nationally applicable MACT standard to address them. The EPA expects to promulgate a final standard in 2004.

Table 4-7 shows HAPs emitted by the proposed CFB unit.

Table 4-7 Hazardous air pollutants emissions for the CFB unit

Hazardous Air Pollutant	Tons Per Year	
	Petroleum Coke	Coal
Ammonia	69.2	69.2
Hydrogen Chloride	1.1	5.3
Hydrogen Fluoride	0.2	0.4
Other Trace Elements	0.8	0.1
Mercury	6.4 lbs/yr	11.0 lbs/yr
Organic HAPs	0.6	0.6

Major sources of HAP emissions are defined as sources with the potential to emit 10 tpy of any individual federally regulated HAP or 25 tpy on any combination of federally regulated HAPs listed in Section 112(b)(1) of the Clean Air Act Amendments.

Mercury emissions will not be subject to case by case MACT because the emission of each individual HAP is less than 10 tons per year and the combined emissions of all HAPs are less than 25 tons per year.

General HAP requirements

Since the proposed CFB unit would be subject to a regulation contained in 40 CFR Part 63, they would also have general notification, record keeping, and monitoring requirements under 40 CFR Part 63, Subpart A.

Prevention of accidental releases

The CAA amendments of 1990 include language that requires chemical accident prevention provisions at affected facilities. Affected facilities are those stationary sources that store, use or handle any of 140 listed hazardous substances in amounts greater than the listed threshold quantities. Section 112(r) of 40 CFR Part 58, "Prevention of Accidental Releases," establishes the requirements for owners and operators of stationary sources that produce, process, handle or store any of the regulated chemicals. The purpose of this requirement is to prevent and mitigate accidental releases of these substances by preparing a detailed risk assessment and implementing a number of safety procedures through the preparation of a Risk Management Plan.

MPU has stated its intention to do an analysis after the plant design is finalized to determine if it would store any of the listed chemicals or substances in quantities near or above the threshold levels. It has also stated its intention to comply with the general duty clause of the CAA, Section 112(r)(1).

Compliance Assurance Monitoring

The Compliance Assurance Monitoring (CAM) rule (40 CFR Part 64) establishes criteria for monitoring certain existing air pollution control devices to provide reasonable assurance of compliance with emission limits and standards. As specified in 40 CFR § 64.2(a), the CAM rule applies, on a pollutant-specific basis, to each emission unit at a major source if it:

1. Is subject to an emission limitation or standard for the pollutant.
2. Uses a control device to achieve compliance with the limit or standard.
3. Has the potential for uncontrolled emissions of the pollutant equal to or greater than the major source threshold for that pollutant (in this case, 100 tpy of any criteria pollutant, 10 tpy of any individual HAP, or 25 tpy of any combination of HAPs).

However, 40 CFR 64.2(b)(1)(iii) specifies an exemption from the CAM rule for emission units (on a pollutant-specific basis) that are subject to Acid Rain Program requirements.

MPU will submit the CAM applicability determination as part of the final operating permit application.

Biological Environment

Because the site lies completely within the existing power plant boundary, and no vegetation, animal communities, endangered or threatened species are known to exist at the site, there would be no impacts on vegetation or animal communities.

Visual Landscape

Impact During Construction and Operation

As proposed by MPU, the building and storage facilities would be expanded from 84,000 and 110, 400 square feet, to 91, 200 and 195,000 square feet, respectively, on land currently owned by MPU in order to accommodate the new unit. No additional land purchase is required.

Due to the limited open area available at the MPU Power Plant, off-site space would be required for construction parking and temporary equipment lay-down. The city owns property less than one mile north of the site, adjacent to the C. Reis dock facilities, that may provide sufficient space. MPU may also elect to lease parking at the dock during the construction period. This use would not alter the area. Equipment and materials that require indoor storage, along with hazardous chemicals and fuels, would be stored at the MPU Power Plant.

These changes are expected to be temporary and would not affect the long-term visual landscape.

Lightening Impact During Construction and Operation

The current intensity of lighting at the MPU Power Plant would not change with the addition of Unit 9. The new facilities would be shielded from the surrounding community by the existing plant. Any temporary construction lighting would be designed to conform to the current lighting patterns and intensities. Any new light fixtures would be selected to provide the necessary safe illumination at ground level, while minimizing stray light above and to the sides.

Noise Level Impact

Specific sound level data were not provided, however, the proposed new boiler would be using the existing stack, and the new turbine would be enclosed in a double steel walled building designed to minimize external sound transmission. No significant increases in sound level are anticipated.

Because the new steam turbine is to be housed in a building designed to contain noise from the unit, the proposed plant addition is expected to cause an increase of less than 1 dBA over existing levels.

Sound levels associated with the existing and coal unloading area would be periodic and of limited duration. Currently coal unloading occurs 10 hours per week during the day, and is expected to increase to 20 hours per week. Lincoln School, located to the west of the rail track on which the coal is delivered could experience some increased noise during unloading. This problem could be mitigated either by unloading

coal when the school is not in session, such as late in the afternoon or weekends, or constructing a 20-foot high noise barrier adjacent to the coal shaking facility.

Workforce and Plant Staffing

MPU anticipates that construction of the power plant addition would take 30 to 36 months. The typical number of construction employees on one shift during any single day is expected to be about 30 workers, with up to 100 workers on one shift during peak construction activity. The work force would include skilled and professional workers, including civil, structural, mechanical, and electrical engineers, electricians, pipe and steamfitters, instrument and control technicians, carpenters, and general construction workers.

Once the power plant addition was completed, outside contractors would only be used when needed for major maintenance overhauls and inspections. The utility does not anticipate hiring any new MPU Power Plant employees. MPU expects to maintain its current power plant employment levels at about 40 full time equivalent staff. These current power plant positions include technical engineers, plant manager, supervisory staff, and skilled technicians and operators.

Fogging and Icing

The proposed power plant addition does not utilize cooling towers, therefore, no cooling tower fogging, icing, or visible plumes would occur.

Other Environmental Impact

As discussed in Section 3.7, WHS listings indicate the existence of two shipwrecks in the Manitowoc River, both in Section 29. However, since the river is not being redirected, nor it will be affected because of the intake and discharge facilities, the Commission expects no adverse environmental impacts to these historic properties.

The city of Manitowoc will continue to provide fire protection, emergency medical services, police services, and waste pick-up services for Manitowoc Public Utilities. Because the site lies completely within an existing plant boundary, and no change is anticipated in the number workers at the MPU power plant once the unit is in operation, therefore, there will be no significant impact to current level of municipal services.

As far land use is concerned, no additional land purchase is required, although the building and storage facilities will be expanded from 84,000 and 110,000 square feet to 91,200 and 195,000 square feet respectively on land currently owned by MPU. Consequently no changes in current land use, ownership or zoning is needed or expected.

Finally, there will be no impact on publicly owned land, schools, day care, nursing homes, hospital or local demography as a result of constructing the new unit.

Traffic

Construction Traffic

Traffic near the plant site will increase during the construction period due to additional workers needed for the project. Construction craft labor will enter the dock area generally along Route 10, which is designed for such traffic flows. From the dock, the craft will be bussed to the plant. As many as 200 cars will be using leased dock space for parking.

Large, oversized, or loads requiring special permits will generally arrive via rail or barge, that will be unloaded directly on the property, thus eliminating the need for the use of city streets. Rail and/or barge shipments will be schedule to avoid interference with other activities.

In addition, an average of about 20 delivery trucks per day are anticipated using the city streets, with regular deliveries restricted to weekday business hours. This will be slightly higher during the early stages (when craft workers are lower) for concrete placement

During the operation period of the new unit, the impact on traffic will be insignificant. Staffing levels will be the same as they are currently. Boiler 5 is a labor intensive unit, and since this unit will be used as a back-up source, workers from this unit will be transferred to operate the new CFB boiler and steam turbine. Although the new unit is larger, additional workers will not be needed due to the many automated control functions.

Traffic on the railroad will increase when the plant is in operation due to the shipment of petroleum coke and limestone for the CFB boiler project. Under average load conditions, it is expected that railcar shipments of petroleum coke and coal will increase to 35 railcars per week and for limestone to increase to 10 railcars per week.

Appendix A

Response to Comments

The Commission issued the draft EIS on the Manitowoc Public Utility Generating Facility Project in July 2003. A 45-day comment period followed the issuance of the draft EIS. The comment period ended on September 5, 2003. Three comments were received. They are shown below.

Comment: Steve Hogler, DNR Fisheries Biologist

The EIS indicates that the inlet structure is not going to be modified, but they intend to increase the amount of water pumped through the plant for cooling. Does this mean that the inflow rate at the structure will increase? High intake velocities could cause fish to become caught on gratings or pulled into the plant. Other Lake Michigan power plants have had this problem with fish (especially when alewife are near shore). Inflow rates should be minimized to reduce catch of fish or other means should be employed to discourage the use of the area by fish.

The allowed temperature difference of 20F between discharged water and ambient lake water seems high. Warm water plumes are attractive to fish during cold water months but can also be deadly if the water flow is cut off or weather conditions reduce the size of the warm water plume. Several fish kills during the past several years have been caused by these type of events. The plant should minimize the differences in temperature.

Response: David Gerdman, DNR Fisheries

The concerns about fish entrainment will be at least partially addressed by requirements in MPU's soon-to-be modified permit. MPU is not required to monitor the flow rate at their intake structure, but an increased flow rate through the same area would imply an increased velocity. The discharge temperature has already been greater than ambient lake temperature for several years already.

Comment: Mike Hammer DNR

Add the following text:

On page 11 of the draft EIS, edit the first paragraph as follows:

The developer of a proposed power plant must obtain several permits from the Wisconsin Department of Natural Resources (DNR). The primary DNR approval needed before power plant construction may begin is the construction permit for a new source emitting significant quantities of air pollutants. DNR storm water management permits are necessary during construction and operation of the power plant. A WPDES discharge permit must be issued prior to the power plant initiating the discharge of process wastewaters, including once-through condenser cooling water, to surface waters. Construction plans must be approved by

the DNR before process wastewater outfalls are constructed. Other DNR permits may be required for various parts of a power plant project, depending on circumstances and the expected impacts.

The following information should be included in Table 1-3:

DNR – Bureau of Watershed Management	WPDES Process Wastewater Discharge Permit	ch. 283, Stats.	Mike Hammers (608)267-7640
DNR – Bureau of Watershed Management	Approval of outfall and discharge monitoring equipment plans	s. 283.41, Stats.	Mike Hammers (608)267-7640

On page 42, add the following paragraph after the first paragraph below Table 4-2:

Since the proposed increase in water withdrawal from Lake Michigan will not result in a water loss greater than 2.0 million gallons, a water loss approval is not required pursuant to Wis. Admin. Code s. NR 142.06.

On page 42, add the following paragraph between the two paragraphs under the heading “Waster Usage and Discharge – Surface or Municipal”:

The discharge of non-contact, once-through cooling water from the existing MPU Power Plant is addressed by WPDES Permit No. WI-0027189-6. The permit will be modified to cover the proposed increase in discharge.

On page 43, add the following sentence to the first paragraph:

Approval by the DNR of construction plans for the outfall and discharge monitoring equipment is required.

Other Items:

In its application for modification of its WPDES discharge permit, MPU indicates that the discharge pipe for once-through condenser cooling water from Unit 9 to Lake Michigan will be 48 inches in diameter. The draft EIS, however, indicates more than once that the discharge pipe will be 36 inches in diameter.

The draft EIS appears to be inconsistent on whether or not equipment will be located in new or existing buildings. The draft EIS states that MPU will expand its building from 84,000 to 110,400 square feet. In addition, Figure 1-2 shows the new steam turbine/generator set located in a new building. More than once, however, the draft EIS states that the new unit would be located within an existing building.

Acronyms

Abbreviation or Acronym	Definition
ACGIH	American Conference of Governmental and Industrial Hygienists
AP-7	Advance Plan 7
ATC	American Transmission Company
BACT	Best Available Control Technologies
BTU	British thermal unit
CA	Certificate of Authority
CAM	Compliance Assurance Monitoring
CFB	Circulating fluidized bed
CN	Canadian National Railroad
CO	Carbon monoxide
CO ₂	Carbon dioxide
Commission or PSC	Public Service Commission of Wisconsin
CPCN	Certificate of Public Convenience and Necessity
CT	Combustion turbine
dB	Decibels
dBA	Decibels A-weighted
dBc	Decibels C-weighted
°F	Degrees Fahrenheit
DNR	State of Wisconsin Department of Natural Resources
DOA	Wisconsin Department of Administration
DOC	Wisconsin Department of Commerce
DOE	U.S. Department of Energy
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
gpm	Gallons per minute
Gr/acf	Grains per actual cubic foot
Gr/dscf	Grains per dry standard cubic foot
GWh	Gigawatt hours (billionwatt hours)
HAP	Hazardous air pollutant
H _g	Mercury
H ₂ SO ₄	Sulfuric acid mist
Hz	Hertz
IPP	Independent power producer

**PUBLIC SERVICE COMMISSION OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

Abbreviation or Acronym	Definition
kV	Kilovolt – 1,000 volts
kW	Kilowatt
kWh	Kilowatt-hour
lbs./hr.	Pounds per hour
L ₁₀	Sound levels exceeded 10 percent of the time during measurement period
L ₅₀	Sound levels exceeded 50 percent of the time during measurement period
L ₉₀	Sound levels exceeded 90 percent of the time during measurement period
L _{eq}	Equivalent continuous sound level – a measure of average energy representing the steady state noise level during measurement period
L _n	Octave band unweighted sound levels
MACT	Maximum achievable control technologies
mmBtu	Million British thermal units
MPU	Manitowoc Public Utilities
MPU Power Plant	Columbus Street Power Plant
MW	Megawatt
MWh	Megawatt hour
NAAQS	National Ambient Air Quality Standards
NHI	National Heritage Inventory
NOAA	National Oceanic and Atmospheric Administration
N _s B	Nichols soil, very fine sandy loam
N _s C ₂	Nichols soil, fine sandy loam
NSPS	New Source Performance Standard
NO ₂	Nitrogen dioxide
NO ₃₋	Nitrate
NO _x	Nitrogen oxide
NSR	New Source Review
O ₂	Ozone
Pb	Lead
PM	Particulate matter
PM ₁₀	Particulate matter less than 10 microns in diameter
PM ₂₅	Particulate matter less than 25 microns in diameter
PPM	Parts per million
PSC or Commission	Public Service Commission of Wisconsin
PSD	Prevention of significant deterioration
PSIG	Pounds per square inch gauge
SNCR	Selective Non-Catalytic Reactor
SO ₂	Sulfur dioxide
SO ₄	Sulfate
SRU	Sulfur recovery unit
STEP	Statewide Technical and Economic Potential

**PUBLIC SERVICE COMMISSION OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

Abbreviation or Acronym	Definition
SWPPP	Storm Water Pollution Prevention Plan
TLV	Threshold limit value
T _{py}	Total suspended particulates
µg/m ³	Micrograms per cubic meter
VOC	Volatile organic compounds
WEPA	Wisconsin Environmental Policy Act
WEPCO	Wisconsin Electric Power Company
WHS	Wisconsin Historical Society
WPDES	Wisconsin Pollution Discharge Elimination System
WPSC	Wisconsin Public Service Corporation

